

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Delphine COPPENS et al.

Group Art Unit: 1772

Serial No.: 09/885,395

Examiner: Patricia L. Nordmeyer

Confirmation No.: 3952

Filed: 20 June 2001

Docket No.: 55550US006

Title: LABEL FOR AFFIXING TO A GARMENT

## Mail Stop Appeal Brief - Patents

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

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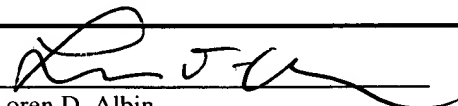
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- ☒ Please charge Deposit Account No. 13-4895 in the amount of \$500.00, for submission of an Appeal Brief.
- ☐ A certified copy of a \_\_ application, Serial No. \_\_, filed \_\_\_\_, the right of priority of which is claimed under 35 U.S.C. §119.
- ☒ Other: Appeal Brief (10 pgs); Claims Appendix (2 pgs); Evidence Appendix (1 pg); and Appendix C-Cited Authorities and Documents (77 pgs).
- Amendment ☐ No Additional fee is required. ☐ The fee has been calculated as shown:

Fee Calculation for Claims Pending After Amendment					
	Pending Claims after Amendment (1)	Claims Paid for Earlier (2)	Number of Additional Claims (1-2)	Cost per Additional Claim	Additional Fees Required
Total Claims				x \$50 =	
Independent Claims				x \$200 =	
One or More New Multiple Dependent Claims Presented? If Yes, Add \$360 Here →					
Total Additional Claim Fees Required					

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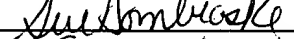
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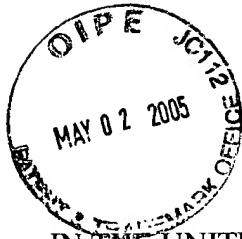
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By:   
 Name: Sue Dombroske

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PATENT  
Docket No. 55550US006

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant(s): Delphine COPPENS et al.	)	Group Art Unit:	1772
	)		
Serial No.: 09/885,395	)	Examiner: Patricia L. Nordmeyer	
Confirmation No.: 3952	)		
	)		
Filed: 20 June 2001	)		
	)		
For: LABEL FOR AFFIXING TO A GARMENT			

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**APPEAL BRIEF**

Commissioner for Patents  
**Mail Stop Appeal Brief - Patents**  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is presented in support of the Notice of Appeal filed 1 March 2005, from the final rejection of claims 19-30 of the above-identified application under 37 C.F.R. §§1.113 and 1.191. This Appeal Brief is being submitted as set forth in 37 C.F.R. §41.37. Please charge Deposit Account No. 13-4895 the fee for filing this Appeal Brief under 37 C.F.R. §41.20(b)(2).

**Real Party in Interest**

The real party in interest of the above-identified patent application is the assignee, 3M Innovative Properties Company, as evidenced by the assignment recorded at Reel 012152, Frame 0345.

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**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 2 of 10

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**Related Appeals and Interferences**

There are no appeals or interferences known to Appellants' Representatives which would directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

**Status of Claims**

Claims 1-18 having been canceled, the pending claims are claims 19-30, all of which are rejected and listed in the CLAIMS APPENDIX.

**Status of Amendments**

A Response under 37 C.F.R §1.116 was submitted on 25 January 2005, but no claims were amended. An Advisory Action mailed 24 February 2005, indicated that the request for reconsideration had been considered, but did not place the application in condition for allowance.

**Summary of Claimed Subject Matter**

Independent claim 19 recites a label material (e.g., reference numeral 24, in Fig. 1 and page 8, lines 30-31 of the present specification) including a backing layer (e.g., reference numeral 16, in Fig. 1, page 4, lines 10-19, and page 8, line 31 of the present specification); a first adhesive layer (e.g., reference numeral 18, in Fig. 1, page 9, lines 4-6 of the present specification) including a heat activatable adhesive (e.g., page 4, line 20 to page 5, line 16, and page 9, line 5 of the present specification); and a second adhesive layer (e.g., reference numeral 28, in Fig. 1 and page 9, line 5 of the present specification) that is not a hot melt adhesive layer (e.g., page 2, line 26 to page 3, line 26 of the present specification) and includes an elastomeric microsphere adhesive (e.g., page 5, line 17 to page 7, line 27, and page 9, lines 5-6 of the present specification).

**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 3 of 10

Independent claim 26 recites a label material (e.g., reference numeral 24, in Fig. 1 and page 8, lines 30-31 of the present specification) including a backing layer (e.g., reference numeral 16, in Fig. 1, page 4, lines 10-19, and page 8, line 31 of the present specification) having a first and second major side; a first adhesive layer (e.g., reference numeral 18, in Fig. 1, page 9, lines 4-6 of the present specification) including a heat activatable adhesive (e.g., page 4, line 20 to page 5, line 16, and page 9, line 5 of the present specification) and carried by the first major side of the backing layer; a second adhesive layer (e.g., reference numeral 28, in Fig. 1 and page 9, line 5 of the present specification) that is not a hot melt adhesive layer (e.g., page 2, line 26 to page 3, line 26 of the present specification), includes an elastomeric microsphere adhesive (e.g., page 5, line 17 to page 7, line 27, and page 9, lines 5-6 of the present specification) and carried by the first adhesive layer; and means for retroreflecting light carried by the second major side of the backing layer (e.g., page 8, lines 11-29 of the present specification).

**Grounds of Rejection to be Reviewed on Appeal**

I. Claims 19, 20, 22, and 24-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Stahl (U.S. Patent No. 6,194,044) in view of Silver et al. (U.S. Patent No. 5,118,750).

II. Claims 21, 23, and 26-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Stahl (U.S. Patent No. 6,194,044) in view of Silver et al. (U.S. Patent No. 5,118,750), and further in view of Bingham (U.S. Patent No. 3,758,192).



**Argument**

**I. Claims 19, 20, 22, and 24-25 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Stahl (U.S. Patent No. 6,194,044) in view of Silver et al. (U.S. Patent No. 5,118,750). Appellants respectfully traverse the rejections, and request review and reversal by the Board.**

***A. THERE IS NO SUGGESTION OR MOTIVATION TO COMBINE THE DOCUMENTS.***

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).” M.P.E.P. §706.02(j).

Appellants respectfully submit that there is no suggestion or motivation, either in documents or in the knowledge generally available to one of ordinary skill in the art, to modify the documents, as discussed in the Amendment and Response submitted 13 August 2004 (e.g., pages 4-6) and in the Response submitted 25 January 2005 (e.g., pages 2-4), the discussion of which is incorporated herein by reference.

Independent claim 19 recites a label material including a backing layer; a first adhesive layer including a heat activatable adhesive; and a second adhesive layer that is not a hot melt adhesive layer and includes an elastomeric microsphere adhesive.

The Examiner asserted that “Stahl teaches a label comprising (in the order given) a backing layer (Fig.2, #12), a first adhesive layer comprising a heat activatable adhesive

(Fig. 2, #14), and a second adhesive layer other than a hot melt adhesive layer, i.e., a pressure sensitive adhesive layer (Fig. 2, #16)” (e.g., page 2, lines 12-14, Final Office Action mailed 1 November 2004). Further, the Examiner asserted that “Silver et al. teach the use of elastomeric microsphere comprising PSA for the purpose of minimizing the loss of adhesive capability of the PSA from the repositioning of the adhesive while also minimizing transfer of the PSA to the attached substrate (Col.1, lines 16-28; Col.3, lines 12-23)” (e.g., page 3, lines 11-14, Final Office Action mailed 1 November 2004). The Examiner concluded that it was obvious to combine the teachings of Stahl and Silver et al. because “each of the aforementioned references are analogous insofar as being directed at pressure sensitive adhesive substrates, the teachings of Silver et al. providing a comparative advantage over the PSA of Stahl insofar as improving upon the repositionability of the adhesive substrate” (e.g., page 3, lines 16-20, Final Office Action mailed 1 November 2004). Appellants earnestly disagree.

Stahl discloses a preference for the “outer adhesive being a pressure and *heat sensitive adhesive*” (e.g., column 4, lines 60-61 and column 5, lines 13-14, emphasis added). In contrast, Silver et al. disclose solvent insoluble microspheres that are infusible (i.e., *non-heat sensitive*). Thus, one of skill in the art would have no motivation to combine the *non-heat sensitive microspheres* of Silver et al. with the label of Stahl, because Stahl discloses a preference for a *heat sensitive adhesive*.

Moreover, labels as claimed in the present invention (i.e., including a first adhesive layer including a heat activatable adhesive; and a second adhesive layer that is not a hot melt adhesive layer and includes an elastomeric microsphere adhesive) can offer useful properties that are not suggested by the cited art. Such properties include, for example, increased repositionability and increased durability. For example, as shown in Table 1 of the present application, Comparative Example C2 (not of the present invention) with a solvent borne PSA at a dry thickness of twenty microns passed the

twenty minute removability test, failed the three day removability test, and failed the durability on washing test. In contrast, Example 4 (of the present invention) with a solvent-dispersed microsphere type PSA at a dry thickness of twenty microns passed the twenty minute repositionability test, passed the three-day repositionability test, and passed the durability on washing test.

***B. STAHL'S SILENCE IS NOT A SUBSTITUTE FOR ADEQUATE DISCLOSURE  
REQUIRED TO SUPPORT A CONCLUSION OF OBVIOUSNESS***

Stahl discloses the use of "a thermoplastic adhesive **14** coating one face of the fabric layer **12**; a pressure-sensitive adhesive **16** coating the thermoplastic adhesive **14**" (e.g., column 3, lines 1-3). However, this passage is silent regarding whether the second layer is a hot melt adhesive.

However, the Examiner asserted that "Stahl's silence with regards to the PSA being a hot melt adhesive is an implicit disclosure of the PSA NOT being a hot melt adhesive. The burden is upon the applicant to prove otherwise" (e.g., page 5, lines 19-21, Office Action mailed 1 November 2004). Appellants earnestly disagree.

"The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness." M.P.E.P. §2142. Further, "[t]o support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985). In evaluating lack of disclosure regarding an obviousness rejection, the Court of Customs and Patent Appeals has stated that "[s]ilence in a reference is hardly a proper substitute for an adequate disclosure of facts from which a conclusion of obviousness may justifiably follow." (*See*

**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 7 of 10

*In re Burt and Walter*, 148 U.S.P.Q. 548, 553 (C.C.P.A 1966)). Appellants respectfully submit that Stahl's silence regarding a second layer other than a hot melt adhesive is not a "proper substitute for an adequate disclosure of facts" required to support a conclusion of obviousness.

Stahl describes the "outer adhesive being a pressure and *heat* sensitive adhesive" (e.g., column 4, lines 60-61 and column 5, lines 13-14, emphasis added). Moreover, Appellants respectfully note that "[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984), M.P.E.P. §2141.02. Appellants respectfully submit that Stahl's characterization of the outer adhesive being a pressure and *heat* sensitive adhesive leads away from the claimed invention (e.g., a second adhesive layer *other than a hot melt adhesive layer*, as recited in claims 19 and 26).

Although, the Examiner asserted that "the mere fact that an adhesive substrate is heat sensitive does not necessarily mean that the adhesive is a hot melt adhesive" (e.g., page 6, line 2-3, Office Action mailed 1 November 2004), Appellants respectfully submit that they do not have a burden of showing what necessarily follows from the disclosure of Stahl. In contrast, if the Examiner is basing the rejection on inherent properties of the second adhesive layer disclosed by Stahl, it is the Examiner's burden to show that the inherent properties necessarily follow, as recited, for example, in the M.P.E.P. §2112:

"To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' "

**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 8 of 10

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*In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999).

Appellants respectfully submit that the Examiner has not met that burden.

As such, Appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness of claims 19, 20, 22, and 24-25 under 35 U.S.C. §103(a).

Appellants respectfully request reversal by the Board.

**II. Claims 21, 23, and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Stahl (U.S. Patent No. 6,194,044) in view of Silver et al. (U.S. Patent No. 5,118,750), and further in view of Bingham (U.S. Patent No. 3,758,192). Appellants respectfully traverse the rejections, and request review and reversal by the Board.**

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).” M.P.E.P. §706.02(j).

Appellants respectfully submit that there is no suggestion or motivation, either in documents or in the knowledge generally available to one of ordinary skill in the art, to modify the documents. Appellants note that claims 21 and 23 depend from independent claim 19, discussed herein above. Independent claim 26 recites a label material including a backing layer having a first and second major side; a first adhesive layer including a heat activatable adhesive and carried by the first major side of the backing layer; a second

**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 9 of 10

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adhesive layer that is not a hot melt adhesive layer, includes an elastomeric microsphere adhesive and carried by the first adhesive layer; and means for retroreflecting light carried by the second major side of the backing layer. Claims 27-30 depend from claim 26.

The disclosure of Stahl in view of Silver et al. has been discussed herein above. In brief, one of skill in the art would have no motivation to combine the *non-heat sensitive microspheres* of Silver et al. with the label of Stahl, because Stahl discloses a preference for a *heat sensitive adhesive*. Further, Stahl is silent regarding whether the second layer is a hot melt adhesive.

Bingham discloses "colored reflex-reflecting structures, particularly reflex-reflecting signs, fabrics and transfer films, in which a monolayer of small transparent glass beads or microspheres is embedded in a binder layer having a reflective nacreous pigment embedded therein" (e.g., column 1, lines 7-12). Based upon the remarks herein above, Appellants respectfully submits that Bingham fails to provide the motivation to combine documents that is missing from Stahl in view of Silver et al., as noted herein above.

As such, Appellants respectfully submit that the Examiner has failed to establish a *prima facie* case of obviousness of claims 21, 23, and 26-30 under 35 U.S.C. §103(a). Appellants respectfully request reversal by the Board.

**Appeal Brief**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

Page 10 of 10

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**Conclusion**

For at least the reasons presented herein above, Appellants respectfully submit that the Examiner has failed to present a *prima facie* case of unpatentability of claims 19-30. Review and reversal by the Board of the rejection under 35 U.S.C. §103(a) of claims 19-30 is respectfully requested.

Respectfully submitted,

Delphine COPPENS et al.

By

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May 2, 2005

Date

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By: 

Name: Sue Dombroske



**CLAIMS APPENDIX**  
**Serial No.: 09/885,395**  
**Docket No.: 55550US006**

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1-18. **(Canceled)**

19. **(Rejected)** A label, comprising in the order given:

a backing layer;

a first adhesive layer comprising a heat activatable adhesive; and

a second adhesive layer other than a hot melt adhesive layer, comprising an elastomeric microsphere adhesive.

20. **(Rejected)** A label according to claim 19, wherein said second adhesive layer is provided directly on said first adhesive layer.

21. **(Rejected)** A label according to claim 19, wherein said backing layer has a first and second major side, said first major side being retroreflective and said second major side carrying said first and second adhesive layers.

22. **(Rejected)** A label according to claim 19, wherein said first adhesive layer is non-tacky at temperatures less than 25°C and wherein said first adhesive layer is activated when heated to a temperature between 100°C and 180°C.

23. **(Rejected)** A label according to claim 19, wherein said backing layer has a first and second major side, said first major side carrying a removable protective layer and said second major side carrying said first and second adhesive layers.

24. **(Rejected)** A label according to claim 19, further comprising a removable layer protecting said second adhesive layer.



25. **(Rejected)** A label according to claim 19, wherein the thickness of said second adhesive layer is between 10  $\mu\text{m}$  and 40  $\mu\text{m}$ .
26. **(Rejected)** A label comprising:  
a backing layer having a first and second major side;  
a first adhesive layer comprising a heat activatable adhesive and carried by the first major side of the backing layer;  
a second adhesive layer other than a hot melt adhesive layer, comprising an elastomeric microsphere adhesive and carried by the first adhesive layer; and  
means for retroreflecting light carried by the second major side of the backing layer.
27. **(Rejected)** The label of claim 26, wherein the second adhesive layer is provided directly on the first adhesive layer.
28. **(Rejected)** The label of claim 26, wherein the retroreflecting means comprises elements selected from the group consisting of microspheres and cube corner elements.
29. **(Rejected)** The label of claim 28, wherein the retroreflecting means comprises glass beads.
30. **(Rejected)** The label of claim 26, further comprising:  
a protective layer covering the retroreflecting means.



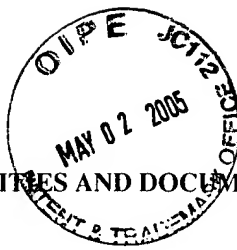
**EVIDENCE APPENDIX**

**Serial No.: 09/885,395**

**Docket No.: 55550US006**

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1. U.S. Patent No. 6,194,044 (Stahl) (First relied upon by the Examiner in the rejection under 35 U.S.C. §103(a) in the Non-Final Office Action mailed 16 March 2004, and cited in the accompanying PTO-892 form).
2. U.S. Patent No. 5,118,750 (Silver et al.) (First relied upon by the Examiner in the rejection under 35 U.S.C. §103(a) in the Non-Final Office Action mailed 16 March 2004, and cited in the accompanying PTO-892 form).
3. U.S. Patent No. 3,758,192 (Bingham) (First relied upon by the Examiner in the rejection under 35 U.S.C. §103(a) in the Non-Final Office Action mailed 3 October 2002, and cited in the accompanying PTO-892 form).



**Appendix C - CITED AUTHORITIES AND DOCUMENTS**

**Page C-1**

Serial No.: 09/885,395

Confirmation No.: 3952

Filed: 20 June 2001

For: LABEL FOR AFFIXING TO A GARMENT

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1. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).
2. M.P.E.P. §706.02(j) (Eight Edition, May 2004 revision).
3. M.P.E.P. §2142 (Eight Edition, May 2004 revision).
4. *Ex parte Clapp*, 227 U.S.P.Q. 972, 973 (Bd. Pat. App. & Inter. 1985).
5. *In re Burt and Walter*, 148 U.S.P.Q. 548, 553, 356 F.2d 115, 121 (C.C.P.A. 1966)).
6. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 U.S.P.Q. 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984).
7. M.P.E.P. §2141.02 (Eight Edition, May 2004 revision).
8. M.P.E.P. §2112 (Eight Edition, May 2004 revision).
9. *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999).

**FULL TEXT OF CASES (USPQ2D)**

All Other Cases

**In re Vaeck (CA FC) 20 USPQ2d 1438 In re Vaeck****U.S. Court of Appeals Federal Circuit  
20 USPQ2d 1438****Decided October 21, 1991****No. 91-1120****Headnotes****PATENTS****1. Patentability/Validity - Obviousness - Combining references (§ 115.0905)**

Rejection of claimed subject matter as obvious under 35 USC 103 in view of combination of prior art references requires consideration of whether prior art would have suggested to those of ordinary skill in art that they should make claimed composition or device, or carry out claimed process, and whether prior art would also have revealed that such person would have reasonable expectation of success; both suggestion and reasonable expectation of success must be founded in prior art, not in applicant's disclosure.

**2. Patentability/Validity - Obviousness - Relevant prior art - Particular inventions (§ 115.0903.03)**

Patent and Trademark Office has failed to establish prima facie obviousness of claims for use of genetic engineering techniques for producing proteins that are toxic to insects such as larvae of mosquitos and black flies, since prior art does not disclose or suggest expression in cyanobacteria of chimeric gene encoding insecticidally active protein, or convey to those of ordinary skill reasonable expectation of success in doing so;

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expression of antibiotic resistance-conferring genes in cyanobacteria, without more, does not render obvious expression of unrelated genes in cyanobacteria for unrelated purposes.

### **3. Patentability/Validity - Specification - Enablement (§ 115.1105)**

## **JUDICIAL PRACTICE AND PROCEDURE**

### **Procedure - Judicial review - Standard of review - Patents (§ 410.4607.09)**

Specification must, in order to be enabling as required by 35 USC 112, first paragraph, teach person skilled in art to make and use invention without "undue experimentation," which does not preclude some experimentation; enablement is question of law which is reviewed independently on appeal, although such determination is based upon underlying factual findings which are reviewed for clear error.

## **PATENTS**

### **4. Patentability/Validity - Specification - Enablement (§ 115.1105)**

Patent and Trademark Office did not err in rejecting, as non-enabling pursuant to 35 USC 112, first paragraph, claims for use of genetic engineering techniques for producing proteins that are toxic to insects such as larvae of mosquitos and black flies, in view of relatively incomplete understanding of biology of cyanobacteria as of applicants' filing date, as well as limited disclosure by applicants of particular cyanobacterial genera operative in claimed invention, since there is no reasonable correlation between narrow disclosure in applicants' specification and broad scope of protection sought in claims encompassing gene expression in any and all cyanobacteria.

## **Case History and Disposition:**

Page 1439

**Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.**

**Application for patent, serial no. 07/021,405, filed March 4, 1987, by Mark A. Vaeck, Wipa Chungjatupornchai, and Lee McIntosh (hybrid**

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genes incorporating a DNA fragment containing a gene coding for an insecticidal protein, plasmids, transformed cyanobacteria expressing such protein and method for use as a biocontrol agent). From decision rejecting claims 1-48 and 50-52 as unpatentable under 35 USC 103, and rejecting claims 1-48 and 50-51 for lack of enablement, applicants appeal. Affirmed and part and reversed in part; Mayer, J., dissents with opinion.

**Attorneys:**

Ian C. McLeod, Okemos, Mich., for appellant.

Teddy S. Gron, associate solicitor (Fred E. McKelvey, solicitor and Richard E. Schafer, associate solicitor, with him on brief), for appellee.

**Judge:**

Before Rich, Archer, and Mayer, circuit judges.

**Opinion Text**

**Opinion By:**

Rich, J.

This appeal is from the September 12, 1990 decision of the Patent and Trademark Office (PTO) Board of Patent Appeals and Interferences (Board), affirming the examiner's rejection of claims 1-48 and 50-52 of application Serial No. 07/021,405, filed March 4, 1987, titled "Hybrid Genes Incorporating a DNA Fragment Containing a Gene Coding for an Insecticidal Protein, Plasmids, Transformed Cyanobacteria Expressing Such Protein and Method for Use as a Biocontrol Agent" as unpatentable under 35 USC 103, as well as the rejection of claims 1-48 and 50-51 under 35 USC 112, first paragraph, for lack of enablement. We reverse the § 103 rejection. The § 112 rejection is affirmed in part and reversed in part.

**BACKGROUND**

**A. *The Invention***

The claimed invention is directed to the use of genetic engineering techniques 1 for production of proteins that are toxic to insects such as larvae of mosquitos and black flies. These swamp-dwelling pests are the source of numerous human health problems, including malaria. It is known that certain species of the naturally-occurring *Bacillus* genus of bacteria produce proteins ("endotoxins") that are toxic to these insects. Prior art methods of combatting the insects involved spreading or spraying crystalline spores of

the insecticidal *Bacillus* proteins over swamps. The spores were environmentally unstable, however, and would often sink to the bottom of a swamp before being consumed, thus rendering this method prohibitively expensive. Hence the need for a lower-cost method of producing the insecticidal *Bacillus* proteins in high volume, with application in a more stable vehicle.

As described by appellants, the claimed subject matter meets this need by providing for the production of the insecticidal *Bacillus* proteins within host cyanobacteria. Although both cyanobacteria and bacteria are members of the procaryote 2 kingdom, the

Page 1440

cyanobacteria (which in the past have been referred to as "blue-green algae") are unique among procaryotes in that the cyanobacteria are capable of oxygenic photosynthesis. The cyanobacteria grow on top of swamps where they are consumed by mosquitos and black flies. Thus, when *Bacillus* proteins are produced within transformed 3 cyanobacterial hosts according to the claimed invention, the presence of the insecticide in the food of the targeted insects advantageously guarantees direct uptake by the insects.

More particularly, the subject matter of the application on appeal includes a chimeric (i.e., hybrid) gene comprising (1) a gene derived from a bacterium of the *Bacillus* genus whose product is an insecticidal protein, united with (2) a DNA promoter effective for expressing 4 the *Bacillus* gene in a host cyanobacterium, so as to produce the desired insecticidal protein.

The claims on appeal are 1-48 and 50-52, all claims remaining in the application. Claim 1 reads:

1. A chimeric gene capable of being expressed in Cyanobacteria cells comprising:  
(a) a DNA fragment comprising a promoter region which is effective for expression of a DNA fragment in a Cyanobacterium; and  
(b) at least one DNA fragment coding for an insecticidally active protein produced by a *Bacillus* strain, or coding for an insecticidally active truncated form of the above protein or coding for a protein having substantial sequence homology to the active protein, the DNA fragments being linked so that the gene is expressed.

Claims 2-15, which depend from claim 1, recite preferred *Bacillus* species, promoters, and selectable markers. 5 Independent claim 16 and claims 17-31 which depend therefrom are directed to a hybrid plasmid vector which includes the chimeric gene of claim 1. Claim 32 recites a bacterial strain. Independent claim 33 and claims 34-48 which depend therefrom recite a cyanobacterium which expresses the chimeric gene of claim 1. Claims 50-51 recite an insecticidal composition. Claim 52 recites a particular plasmid that appellants have deposited.

## **B. Appellants' Disclosure**

In addition to describing the claimed invention in generic terms, appellants' specification discloses two particular species of *Bacillus* ( *B. thuringiensis*, *B. sphaericus* ) as sources of insecticidal protein; and nine genera of cyanobacteria ( *Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*, *Aphanocapsa*, *Gloecapsa*, *Nostoc*, *Anabaena* and *Ffremyllia* ) as useful hosts.

The working examples relevant to the claims on appeal detail the transformation of a

single strain of cyanobacteria, i.e., *Synechocystis* 6803. In one example, *Synechocystis* 6803 cells are transformed with a plasmid comprising (1) a gene encoding a particular insecticidal protein ("B.t. 8") from *Bacillus thuringiensis* var. *israelensis*, linked to (2) a particular promoter, the P<sub>L</sub> promoter from the bacteriophage Lambda (a virus of *E. coli*). In another example, a different promoter, i.e., the *Synechocystis* 6803 promoter for the rubisco operon, is utilized instead of the Lambda P<sub>L</sub> promoter.

### C. The Prior Art

A total of eleven prior art references were cited and applied, in various combinations, against the claims on appeal.

The focus of Dzelzkalns, 6 the primary reference cited against all of the rejected claims, is to determine whether chloroplast promoter sequences can function in cyanobacteria. To that end Dzelzkalns discloses the expression in cyanobacteria of a chimeric gene comprising a chloroplast promoter sequence fused to a gene encoding the enzyme chloramphenicol acetyl transferase (CAT). 7 Importantly, Dzelzkalns teaches the use of the CAT gene as a "marker" gene; this use of antibiotic resistance-conferring genes for selection purposes is a common technique in genetic engineering.

Page 1441

Sekar I, 8 Sekar II, 9 and Ganesan 10 collectively disclose expression of genes encoding certain *Bacillus* insecticidal proteins in the bacterial hosts *B. megaterium*, *B. subtilis* and *E. coli*.

Friedberg 11 discloses the transformation of the cyanobacterium *Anacystis nidulans* R2 by a plasmid vector comprising the O<sub>L</sub>P<sub>L</sub> operator-promoter region and a temperature-sensitive repressor gene of the bacteriophage Lambda. While the cyanobacteria are attractive organisms for the cloning of genes involved in photosynthesis, Friedberg states, problems may still be encountered such as suboptimal expression of the cloned gene, detrimental effects on cell growth of overexpressed, highly hydrophobic proteins, and rapid turnover of some gene products. To address these problems, Friedberg teaches the use of the disclosed Lambda regulatory signals in plasmid vehicles which, it states, have "considerable potential for use as vectors the expression of which can be controlled in *Anacystis* ...."

Miller 12 compares the initiation specificities *in vitro* of DNA-dependent RNA polymerases 13 purified from two different species of cyanobacteria ( *Fremyella diplosiphon* and *Anacystis nidulans* ), as well as from *E. coli*.

Nierzwicki-Bauer 14 identifies in the cyanobacterium *Anabaena* 7120 the start site for transcription of the gene encoding *rbc* L, the large subunit of the enzyme ribulose-1, 5-bisphosphate carboxylase. It reports that the nucleotide sequence 14-8 base pairs preceding the transcription start site "resembles a good *Escherichia coli* promoter," but that the sequence 35 base pairs before the start site does not.

Chauvat 15 discloses host-vector systems for gene cloning in the cyanobacterium *Synechocystis* 6803, in which the antibiotic resistance-conferring *neo* gene is utilized as a selectable marker.

Reiss 16 studies expression in *E. coli* of various proteins formed by fusion of certain



foreign DNA sequences with the *neo* gene.

Kolowsky 17 discloses chimeric plasmids designed for transformation of the cyanobacterium *Synechococcus* R2, comprising an antibiotic-resistant gene linked to chromosomal DNA from the *Synechococcus* cyanobacterium.

Barnes, United States Patent No. 4,695,455, is directed to the treatment with stabilizing chemical reagents of pesticides produced by expression of heterologous genes (such as those encoding *Bacillus* proteins) in host microbial cells such as *Pseudomonas* bacteria. The host cells are killed by this treatment, but the resulting pesticidal compositions exhibit prolonged toxic activity when exposed to the environment of target pests.

## **D. The Grounds of Rejection**

### **1. The § 103 Rejections**

Claims 1-6, 16-21, 33-38, 47-48 and 52 (which include all independent claims in the application) were rejected as unpatentable under 35 USC 103 based upon Dzelzkalns in view of Sekar I or Sekar II and Ganesan. The examiner stated that Dzelzkalns discloses a chimeric gene capable of being highly expressed in a cyanobacterium, said gene comprising a promoter region effective for expression in a cyanobacterium operably linked to a structural gene encoding CAT. The examiner acknowledged that the chimeric gene and transformed host of Dzelzkalns differ from the claimed invention in that the former's structural gene encodes CAT rather than insecticidally active protein. However, the examiner pointed out, Sekar I, Sekar II, and Ganesan teach genes encoding insecticidally active proteins produced by *Bacillus*, and the advantages of expressing such genes in heterologous hosts to obtain larger quantities of the protein. The examiner contended that it would have been obvious to one of ordinary skill in the art to substitute the *Bacillus* genes taught by Sekar I, Sekar II, and Ganesan for the CAT gene in the vectors of Dzelzkalns in order to obtain high level expression of the *Bacillus* genes in the transformed cyanobacteria. The examiner further contended that it would have been obvious to use cyanobacteria as heterologous hosts for expression of the claimed genes due to the ability of cyanobacteria to serve as transformed hosts for the

Page 1442

expression of heterologous genes. In the absence of evidence to the contrary, the examiner contended, the invention as a whole was *prima facie* obvious.

Additional rejections were entered against various groups of dependent claims which we need not address here. All additional rejections were made in view of Dzelzkalns in combination with Sekar I, Sekar II, and Ganesan, and further in view of other references discussed in Part C above.

The Board affirmed the § 103 rejections, basically adopting the examiner's Answer as its opinion while adding a few comments. The legal conclusion of obviousness does not require absolute certainty, the Board added, but only a reasonable expectation of success, citing *In re O'Farrell*, 853 F.2d 894, 7 USPQ2d 1673 (Fed. Cir. 1988). In view of the disclosures of the prior art, the Board concluded, one of ordinary skill in the art would have been motivated by a reasonable expectation of success to make the substitution suggested by the examiner.

## 2. The § 112 Rejection

The examiner also rejected claims 1-48 and 50-51 under 35 USC 112, first paragraph, on the ground that the disclosure was enabling only for claims limited in accordance with the specification as filed. Citing *Manual of Patent Examining Procedure* (MPEP) provisions 706.03(n) 19 and (z) 20 as support, the examiner took the position that undue experimentation would be required of the art worker to practice the claimed invention, in view of the unpredictability in the art, the breadth of the claims, the limited number of working examples and the limited guidance provided in the specification. With respect to unpredictability, the examiner stated that the cyanobacteria comprise a large and diverse group of photosynthetic bacteria including large numbers of species in some 150 different genera including *Synechocystis*, *Anacystis*, *Synechococcus*, *Agmenellum*, *Nostoc*, *Anabaena*, etc. The molecular biology of these organisms has only recently become the subject of intensive investigation and this work is limited to a few genera. Therefore the level of unpredictability regarding heterologous gene expression in this large, diverse and relatively poorly studied group of procaryotes is high....

The Board affirmed, noting that "the limited guidance in the specification, considered in light of the relatively high degree of unpredictability in this particular art, would not have enabled one having ordinary skill in the art to practice the broad scope of the claimed invention without undue experimentation. *In re Fisher*, 427 F.2d 833, 166 USPQ 18 (CCPA 1970)."

### OPINION

#### A. Obviousness

We first address whether the PTO erred in rejecting the claims on appeal as prima facie obvious within the meaning of 35 USC 103. Obviousness is a legal question which this court independently reviews, though based upon underlying factual findings which we review under the clearly erroneous standard. *In re Woodruff*, 919 F.2d 1575, 1577, 16 USPQ2d 1934, 1935 (Fed. Cir. 1990).

[1] Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed composition or device, or carry out the claimed process; and (2) whether the prior art would also have revealed that in so making or carrying out, those of ordinary skill would have a reasonable expectation of success. *See In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988). Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the applicant's disclosure. *Id.*

Page 1443

[2] We agree with appellants that the PTO has not established the prima facie obviousness of the claimed subject matter. The prior art simply does not disclose or suggest the expression in cyanobacteria of a chimeric gene encoding an insecticidally

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active protein, or convey to those of ordinary skill a reasonable expectation of success in doing so. More particularly, there is no suggestion in Dzelzkalns, the primary reference cited against all claims, of substituting in the disclosed plasmid a structural gene encoding *Bacillus* insecticidal proteins for the CAT gene utilized for selection purposes. The expression of antibiotic resistance-conferring genes in cyanobacteria, without more, does not render obvious the expression of unrelated genes in cyanobacteria for unrelated purposes.

The PTO argues that the substitution of insecticidal *Bacillus* genes for CAT marker genes in cyanobacteria is suggested by the secondary references Sekar I, Sekar II, and Ganesan, which collectively disclose expression of genes encoding *Bacillus* insecticidal proteins in two species of host *Bacillus* bacteria (*B. megaterium* and *B. subtilis*) as well as in the bacterium *E. coli*. While these references disclose expression of *Bacillus* genes encoding insecticidal proteins in certain transformed bacterial hosts, nowhere do these references disclose or suggest expression of such genes in transformed cyanobacterial hosts.

To remedy this deficiency, the PTO emphasizes similarity between bacteria and cyanobacteria, namely, that these are both procaryotic organisms, and argues that this fact would suggest to those of ordinary skill the use of cyanobacteria as hosts for expression of the claimed chimeric genes. While it is true that bacteria and cyanobacteria are now both classified as procaryotes, that fact alone is not sufficient to motivate the art worker as the PTO contends. As the PTO concedes, cyanobacteria and bacteria are not identical; they are classified as two separate divisions of the kingdom Procaryotae.<sup>21</sup> Moreover, it is only in recent years that the biology of cyanobacteria has been clarified, as evidenced by references in the prior art to "blue-green algae." Such evidence of recent uncertainty regarding the biology of cyanobacteria tends to rebut, rather than support, the PTO's position that one would consider the cyanobacteria effectively interchangeable with bacteria as hosts for expression of the claimed gene.

At oral argument the PTO referred to additional secondary references, not cited against any independent claim (i.e., Friedberg, Miller, and Nierzwicki-Bauer), which it contended disclose certain amino acid sequence homology between bacteria and cyanobacteria. The PTO argued that such homology is a further suggestion to one of ordinary skill to attempt the claimed invention. We disagree. As with the Dzelzkalns, Sekar I, Sekar II, and Ganesan references discussed above, none of these additional references disclose or suggest that cyanobacteria could serve as hosts for expression of genes encoding *Bacillus* insecticidal proteins. In fact, these additional references suggest as much about differences between cyanobacteria and bacteria as they do about similarities. For example, Nierzwicki-Bauer reports that a certain nucleotide sequence (i.e., the -10 consensus sequence) in a particular cyanobacterium resembles an *E. coli* promoter, but that another nearby nucleotide sequence (the -35 region) does not. While Miller speaks of certain promoters of the bacteriophage Lambda that are recognized by both cyanobacterial and *E. coli* RNA polymerases, it also discloses that these promoters exhibited differing strengths when exposed to the different polymerases. Differing sensitivities of the respective polymerases to an inhibitor are also disclosed, suggesting differences in the structures of the initiation complexes.

The PTO asks us to agree that the prior art would lead those of ordinary skill to conclude that cyanobacteria are attractive hosts for expression of any and all heterologous genes.

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Again, we can not. The relevant prior art does indicate that cyanobacteria are attractive hosts for expression of both native and heterologous *genes involved in photosynthesis* (not surprisingly, for the capability of undergoing oxygenic photosynthesis is what makes the cyanobacteria unique among procaryotes). However, these references do not suggest that cyanobacteria would be equally attractive hosts for expression of *unrelated* heterologous genes, such as the claimed genes encoding *Bacillus* insecticidal proteins. In *O'Farrell*, this court affirmed an obviousness rejection of a claim to a method for

Page 1444

producing a "predetermined protein in a stable form" in a transformed bacterial host. 853 F.2d at 895, 7 USPQ2d at 1674. The cited references included a prior art publication (the Polisky reference) whose three authors included two of the three coinventor-appellants. The main difference between the prior art and the claim at issue was that in Polisky, the heterologous gene was a gene for ribosomal RNA, while the claimed invention substituted a gene coding for a predetermined protein. *Id.* at 901, 7 USPQ2d at 1679. Although, as the appellants therein pointed out, the ribosomal RNA gene is not normally translated into protein, Polisky mentioned preliminary evidence that the transcript of the ribosomal RNA gene was translated into protein, and further predicted that if a gene coding for a protein were to be substituted, extensive translation might result. *Id.* We thus affirmed, explaining that the prior art explicitly suggested the substitution that is the difference between the claimed invention and the prior art, and presented preliminary evidence suggesting that the [claimed] method could be used to make proteins.

....

... Polisky contained detailed enabling methodology for practicing the claimed invention, a suggestion to modify the prior art to practice the claimed invention, and evidence suggesting that it would be successful.

*Id.* at 901-02, 7 USPQ2d at 1679-80.

In contrast with the situation in *O'Farrell*, the prior art in this case offers no suggestion, explicit or implicit, of the substitution that is the difference between the claimed invention and the prior art. Moreover, the "reasonable expectation of success" that was present in *O'Farrell* is not present here. Accordingly, we reverse the § 103 rejections.

## **B. Enablement**

[3] The first paragraph of 35 USC 112 requires, *inter alia*, that the specification of a patent enable any person skilled in the art to which it pertains to make and use the claimed invention. Although the statute does not say so, enablement requires that the specification teach those in the art to make and use the invention without "undue experimentation." *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988). That *some* experimentation may be required is not fatal; the issue is whether the amount of experimentation required is "undue." *Id.* at 736-37, 8 USPQ2d at 1404. Enablement, like obviousness, is a question of law which we independently review, although based upon underlying factual findings which we review for clear error. *See id.* at 735, 8 USPQ2d at 1402.

In response to the § 112 rejection, appellants assert that their invention is "pioneering,"

and that this should entitle them to claims of broad scope. Narrower claims would provide no real protection, appellants argue, because the level of skill in this art is so high, art workers could easily avoid the claims. Given the disclosure in their specification, appellants contend that any skilled microbiologist could construct vectors and transform many different cyanobacteria, using a variety of promoters and *Bacillus* DNA, and could easily determine whether or not the active *Bacillus* protein was successfully expressed by the cyanobacteria.

The PTO made no finding on whether the claimed invention is indeed "pioneering," and we need not address the issue here. With the exception of claims 47 and 48, the claims rejected under § 112 are not limited to any particular genus or species of cyanobacteria. The PTO's position is that the cyanobacteria are a diverse and relatively poorly studied group of organisms, comprising some 150 different genera, and that heterologous gene expression in cyanobacteria is "unpredictable." Appellants have not effectively disputed these assertions. Moreover, we note that only one particular species of cyanobacteria is employed in the working examples of appellants' specification, and only nine genera of cyanobacteria are mentioned in the entire document.

[4] Taking into account the relatively incomplete understanding of the biology of cyanobacteria as of appellants' filing date, as well as the limited disclosure by appellants of particular cyanobacterial genera operative in the claimed invention, we are not persuaded that the PTO erred in rejecting claims 1-46 and 50-51 under § 112, first paragraph. There is no reasonable correlation between the narrow disclosure in appellants' specification and the broad scope of protection sought in the claims encompassing gene expression in any and all cyanobacteria. *See In re Fisher*, 427 F.2d 833, 839, 166 USPQ 18, 24 (CCPA 1970) (the first paragraph of § 112 requires that the scope of the claims must bear a reasonable correlation to the scope of enablement provided by the specification).

Page 1445

22 Accordingly, we affirm the § 112 rejection as to those claims.

In so doing we do *not* imply that patent applicants in art areas currently denominated as "unpredictable" must never be allowed generic claims encompassing more than the particular species disclosed in their specification. It is well settled that patent applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art. *In re Angstadt*, 537 F.2d 498, 502-03, 190 USPQ 214, 218 (CCPA 1976). However, there must be sufficient disclosure, either through illustrative examples or terminology, 23 to teach those of ordinary skill how to make and how to use the invention as broadly as it is claimed. This means that the disclosure must adequately guide the art worker to determine, without undue experimentation, which species among all those encompassed by the claimed genus possess the disclosed utility. Where, as here, a claimed genus represents a diverse and relatively poorly understood group of microorganisms, the required level of disclosure will be greater than, for example, the disclosure of an invention involving a "predictable" factor such as a mechanical or electrical element. *See Fisher*, 427 F.2d at 839, 166 USPQ at 24. In this case, we agree with the PTO that appellants' limited disclosure does not enable one of ordinary skill to make and use the invention as now recited in claims 1-46 and 50-51 without undue

experimentation.

Remaining dependent claim 47 recites a cyanobacterium which expresses the chimeric gene of claim 1, wherein the cyanobacterium is selected from among the genera *Anacystis* and *Synechocystis*. Claim 48, which depend from claim 47, is limited to the cyanobacterium *Synechocystis* 6803. The PTO did not separately address these claims, nor indicate why they should be treated in the same manner as the claims encompassing all types of cyanobacteria. Although these claims are not limited to expression of genes encoding particular *Bacillus* proteins, we note what appears to be an extensive understanding in the prior art of the numerous *Bacillus* proteins having toxicity to various insects. The rejection of claims 47-48 under § 112 will not be sustained.

### CONCLUSION

The rejection of claims 1-48 and 50-52 under 35 USC 103 is *reversed*. The rejection of claims 1-46 and 50-51 under 35 USC 112, first paragraph, is *affirmed* and the rejection of claims 47 and 48 thereunder is *reversed*.

AFFIRMED-IN-PART, REVERSED-IN-PART

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#### Footnotes

Footnote 1. Basic vocabulary and techniques for gene cloning and expression have been described in *In re O'Farrell*, 853 F.2d 894, 895-99, 7 USPQ2d 1673, 1674-77 (Fed. Cir. 1988), and are not repeated here.

Footnote 2. All living cells can be classified into one of two broad groups, procaryotes and eucaryotes. The procaryotes comprise organisms formed of cells that do not have a distinct nucleus; their DNA floats throughout the cellular cytoplasm. In contrast, the cells of eucaryotic organisms such as man, other animals, plants, protozoa, algae and yeast have a distinct nucleus wherein their DNA resides.

Footnote 3. "Transformed" cyanobacteria are those that have successfully taken up the foreign *Bacillus* DNA such that the DNA information has become a permanent part of the host cyanobacteria, to be replicated as new cyanobacteria are generated.

Footnote 4. "Expression" of a gene refers to the production of the protein which the gene encodes; more specifically, it is the process of transferring information from a gene (which consists of DNA) via messenger RNA to ribosomes where a specific protein is made.

Footnote 5. In the context of the claimed invention, "selectable markers" or "marker genes" refer to antibiotic-resistance conferring DNA fragments, attached to the gene being expressed, which facilitate the selection of successfully transformed cyanobacteria.

Footnote 6. *Nucleic Acids Res.* 8917 (1984).

Footnote 7. Chloramphenicol is an antibiotic; CAT is an enzyme which destroys chloramphenicol and thus imparts resistance thereto.

Footnote 8. *Biochem. and Biophys. Res. Comm.* 748 (1986).

Footnote 9. *Gene* 151 (1985).

Footnote 10. *Mol. Gen. Genet.* 181 (1983).

Footnote 11. *Mol. Gen. Genet.* 505 (1986).

Footnote 12. *J. Bacteriology* 246 (1979).

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Footnote 13. RNA polymerase, the enzyme responsible for making RNA from DNA, binds at specific nucleotide sequences (promoters) in front of genes in DNA, and then moves through the gene making an RNA molecule that includes the information contained in the gene. Initiation specificity is the ability of the RNA polymerase to initiate this process specifically at a site(s) on the DNA template.

Footnote 14. *Proc. Natl. Acad. Sci. USA* 5961 (1984).

Footnote 15. *Mol. Gen. Genet.* 185 (1986).

Footnote 16. *Gene* 211 (1984).

Footnote 17. *Gene* 289 (1984).

Footnote 18. Denotes different species or organism.

Footnote 19. MPEP 706.03(n), "Correspondence of Claim and Disclosure," provides in part:

In chemical cases, a claim may be so broad as to not be supported by [the] disclosure, in which case it is rejected as unwarranted by the disclosure....

Footnote 20. MPEP 796.03(z), "Undue Breadth," provides in part:

n applications directed to intentions in arts where the results are unpredictable, the disclosure of a single species usually does not provide an adequate basis to support generic claims. *In re Sol*, 1938 C.D. 723; 497 O.G. 546. This is because in arts such as chemistry it is not obvious from the disclosure of one species, what other species will work. *In re Dreshfield*, 1940 C.D. 351; 518 O.G. 255 gives this general rule: "It is well settled that in cases involving chemicals and chemical compounds, which differ radically in their properties it must appear in an applicant's specification either by the enumeration of a sufficient number of the members of a group or by other appropriate language, that the chemicals or chemical combinations included in the claims are capable of accomplishing the desired result." ...

Footnote 21. *Stedman's Medical Dictionary* 1139 (24th ed. 1982) (definition of "Prokaryotae"). Prokaryotic organisms are commonly classified according to the following taxonomic hierarchy: Kingdom; Division; Class; Order; Family; Genus; Species. 3 *Bergey's Manual of Systematic Bacteriology* 1601 (1989).

Footnote 22. The enablement rejection in this case was not based upon a post-filing date state of the art, as in *In re Hogan*, 559 F.2d 595, 605-07, 194 USPQ 527, 536-38 (CCPA 1977). See also *United States Steel Corp. v. Phillips Petroleum Co.*, 865 F.2d 1247, 1251, 9 USPQ2d 1461, 1464 (Fed. Cir. 1989) (citing *Hogan*); *Hormone Research Found., Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1568-69, 15 USPQ2d 1039, 1047-48 (Fed. Cir. 1990) (directing district court, on remand, to consider effect of *Hogan* and *United States Steel* on the enablement analysis of *Fisher*), *cert. dismissed*, — U.S. —, 111 S. Ct. 1434 (1991). We therefore do not consider the effect of *Hogan* and its progeny on *Fisher*'s analysis of when an inventor should be allowed to "dominate the future patentable inventions of others." *Fisher*, 427 F.2d at 839, 166 USPQ at 24.

Footnote 23. The first paragraph of § 112 requires nothing more than *objective* enablement. *In re Marzocchi*, 439 F.2d 220, 223, 169 USPQ 367, 369 (CCPA 1971). How such a teaching is set forth, either by the use of illustrative examples or by broad terminology, is irrelevant. *Id.*

## Dissenting Opinion Text

### Dissent By:

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**Mayer, J., dissenting.**

An appeal is not a second opportunity to try a case or prosecute a patent application, and we should not allow parties to "undertake to retry the entire case on appeal." *Perini America, Inc. v. Paper Converting Machine Co.*, 832 F.2d 581, 584, 4 USPQ2d 1621, 1624 (Fed. Cir. 1987); *Eaton Corp. v. Appliance Valves Corp.*, 790 F.2d 874, 877, 229 USPQ 668, 671 (Fed. Cir. 1986). But that is precisely what the court has permitted here. The PTO conducted a thorough examination of the prior art surrounding this patent application and concluded the claims would have been obvious. The board's decision based on the examiner's answer which comprehensively explains the rejection is persuasive and shows how the evidence supports the legal conclusion that the claims would have been obvious. Yet, the court ignores all this and conducts its own examination, if you will, as though the examiner and board did not exist. Even if thought this opinion were more persuasive than the board's, I could not join it because it misperceives the role of the court.

The scope and content of the prior art, the similarity between the prior art and the claims, the level of ordinary skill in the art, and what the prior art teaches are all questions of fact. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966); *Jurgens v. McKasy*, 927 F.2d 1552, 1560, 18 USPQ2d 1031, 1037 (Fed. Cir. 1991). And "[w]here there are two permissible views of

Page 1446

the evidence, the factfinder's choice between them cannot be clearly erroneous." *Anderson v. City of Bessemer City*, 470 U.S. 564, 574 (1985). The mere denomination of obviousness as a question of law does not give the court license to decide the factual matters afresh and ignore the requirement that they be respected unless clearly erroneous. *In re Woodruff*, 919 F.2d 1575, 1577, 16 USPQ2d 1934, 1935 (Fed. Cir. 1990); *In re Kulling*, 897 F.2d 1147, 1149, 14 USPQ2d 1056, 1057 (Fed. Cir. 1990). There may be more than one way to look at the prior art, but on this record we are bound by the PTO's interpretation of the evidence because it is not clearly erroneous and its conclusion is unassailable. I would affirm on that basis.

**- End of Case -**





### 706.02(j) Contents of a 35 U.S.C. 103 Rejection

35 U.S.C. 103 authorizes a rejection where, to meet the claim, it is necessary to modify a single reference or to combine it with one or more other references. After indicating that the rejection is under 35 U.S.C. 103, the examiner should set forth in the Office action:

(A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page number(s) and line number(s) where appropriate,

(B) the difference or differences in the claim over the applied reference(s),

(C) the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter, and

(D) an explanation why one of ordinary skill in the art at the time the invention was made would have been motivated to make the proposed modification.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. "To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references." *Ex parte Clapp*, 227 USPQ 972, 973 (Bd.

Pat. App. & Inter. 1985). See MPEP § 2144 - § 2144.09 for examples of reasoning supporting obviousness rejections.

Where a reference is relied on to support a rejection, whether or not in a minor capacity, that reference should be positively included in the statement of the rejection. See *In re Hoch*, 428 F.2d 1341, 1342 n.3 166 USPQ 406, 407 n. 3 (CCPA 1970).

It is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply. Furthermore, if an initially rejected application issues as a patent, the rationale behind an earlier rejection may be important in interpreting the scope of the patent claims. Since issued patents are presumed valid (35 U.S.C. 282) and constitute a property right (35 U.S.C. 261), the written record must be clear as to the basis for the grant. Since patent examiners cannot normally be compelled to testify in legal proceedings regarding their mental processes (see MPEP § 1701.01), it is important that the written record clearly explain the rationale for decisions made during prosecution of the application.

See MPEP § 2141 - § 2144.09 generally for guidance on patentability determinations under 35 U.S.C. 103, including a discussion of the requirements of *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). See MPEP § 2145 for consideration of applicant's rebuttal arguments. See MPEP § 706.02(l) - § 706.02(l)(3) for a discussion of prior art disqualified under 35 U.S.C. 103(c).

### 706.02(k) Provisional Rejection (Obviousness) Under 35 U.S.C. 102(e)/103 [R-2]

Effective November 29, 1999, subject matter which was prior art under former 35 U.S.C. 103 via 35 U.S.C. 102(e) is now disqualified as prior art against the claimed invention if that subject matter and the claimed invention "were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person." This change to 35 U.S.C. 103(c) applies to all utility, design and plant patent applications filed on or after November 29, 1999, including continuing applications filed under 37 CFR 1.53(b), continued prosecution applications filed under 37 CFR 1.53(d),

### ASCERTAINING LEVEL OF ORDINARY SKILL IS NECESSARY TO MAINTAIN OBJECTIVITY

“The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry.” *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718, 21 USPQ2d 1053, 1057 (Fed. Cir. 1991). The examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge, a layman, those skilled in remote arts, or to geniuses in the art at hand. *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 218 USPQ 865 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

### 2142 Legal Concept of *Prima Facie* Obviousness

The legal concept of *prima facie* obviousness is a procedural tool of examination which applies broadly to all arts. It allocates who has the burden of going forward with production of evidence in each step of the examination process. See *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *In re Linter*, 458 F.2d 1013, 173 USPQ 560 (CCPA 1972); *In re Saunders*, 444 F.2d 599, 170 USPQ 213 (CCPA 1971); *In re Tiffin*, 443 F.2d 394, 170 USPQ 88 (CCPA 1971), *amended*, 448 F.2d 791, 171 USPQ 294 (CCPA 1971); *In re Warner*, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness. If, however, the examiner does produce a *prima facie* case, the burden of coming forward with evidence or arguments shifts to the applicant who may submit additional evidence of nonobviousness, such as comparative test data showing that the claimed invention possesses improved properties not expected by the prior art. The initial evaluation of *prima facie* obviousness thus relieves both the examiner and applicant from evaluating evidence beyond the prior art and the evidence in the specification as filed until the art has been shown to suggest the claimed invention.

To reach a proper determination under 35 U.S.C. 103, the examiner must step backward in time and

into the shoes worn by the hypothetical “person of ordinary skill in the art” when the invention was unknown and just before it was made. In view of all factual information, the examiner must then make a determination whether the claimed invention “as a whole” would have been obvious at that time to that person. Knowledge of applicant’s disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the “differences,” conduct the search and evaluate the “subject matter as a whole” of the invention. The tendency to resort to “hindsight” based upon applicant’s disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

### ESTABLISHING A *PRIMA FACIE* CASE OF OBVIOUSNESS

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done. “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). See MPEP § 2144 -

§ 2144.09 for examples of reasoning supporting obviousness rejections.

When the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper. *Ex parte Skinner*, 2 USPQ2d 1788 (Bd. Pat. App. & Inter. 1986). A statement of a rejection that includes a large number of rejections must explain with reasonable specificity at least one rejection, otherwise the examiner procedurally fails to establish a *prima facie* case of obviousness. *Ex parte Blanc*, 13 USPQ2d 1383 (Bd. Pat. App. & Inter. 1989) (Rejection based on nine references which included at least 40 prior art rejections without explaining any one rejection with reasonable specificity was reversed as procedurally failing to establish a *prima facie* case of obviousness.).

If the examiner determines there is factual support for rejecting the claimed invention under 35 U.S.C. 103, the examiner must then consider any evidence supporting the patentability of the claimed invention, such as any evidence in the specification or any other evidence submitted by the applicant. The ultimate determination of patentability is based on the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence. *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). The legal standard of “a preponderance of evidence” requires the evidence to be more convincing than the evidence which is offered in opposition to it. With regard to rejections under 35 U.S.C. 103, the examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not.

When an applicant submits evidence, whether in the specification as originally filed or in reply to a rejection, the examiner must reconsider the patentability of the claimed invention. The decision on patentability must be made based upon consideration of all the evidence, including the evidence submitted by the examiner and the evidence submitted by the applicant. A decision to make or maintain a rejection in the face of all the evidence must show that it was based on the totality of the evidence. Facts established by rebuttal evidence must be evaluated along with the facts on which the conclusion of obviousness was

reached, not against the conclusion itself. *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990).

See *In re Piasecki*, 745 F.2d 1468, 223 USPQ 785 (Fed. Cir. 1984) for a discussion of the proper roles of the examiner’s *prima facie* case and applicant’s rebuttal evidence in the final determination of obviousness. See MPEP § 706.02(j) for a discussion of the proper contents of a rejection under 35 U.S.C. 103.

## 2143 Basic Requirements of a *Prima Facie* Case of Obviousness

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant’s disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

### 2143.01 Suggestion or Motivation To Modify the References [R-2]

#### THE PRIOR ART MUST SUGGEST THE DESIRABILITY OF THE CLAIMED INVENTION

“There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.” *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.). The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999).

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## **Ex parte Clapp**

**(BdPatApp&Int)**

**227 USPQ 972**

**Opinion dated Feb. 28, 1985**

**U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences**

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### **Headnotes**

#### **PATENTS**

##### **1. Anticipation -- Combining references (§ 51.205)**

To support conclusion that claimed combination is directed to obvious subject matter, references must either expressly or impliedly suggest claimed combination or examiner must present convincing line of reasoning as to why artisan would have found claimed invention to have been obvious in light of references' teachings.

#### **Case History and Disposition:**

Page 972

**Application for patent of ThomasR. Clapp, Serial No. 257,162, filed Apr. 24, 1981. From rejection of Claim 9-19, applicant appeals (Appeal No. 553-54). Reversed.**

#### **Attorneys:**

**Gomer W. Walters, for appellant.**

#### **Judge:**

**Before Bennett, Henon and Spencer, Examiners-in-Chief.**

### **Opinion Text**

#### **Opinion By:**

**Henon, Examiner-in-Chief.**

This appeal is from the decision of the examiner rejecting claims 9 through 19, which constitute all the claims  
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remaining in the application.

The invention relates to an auger type mixing apparatus for mixing cementitious materials employing a volatile liquid. Representative claim 9 reads as follows:

9. Apparatus mounted on a vehicle for mixing a cementitious material in which a volatile liquid is employed comprising:
- an enclosed mixing chamber sealed to prevent the escape of the volatile liquid and any potentially dangerous fumes;
  - a solid frame forming the top of said mixing chamber and having an inlet end thereof pivotably mounted on the vehicle;
  - an easily removable elastomeric trough forming the bottom of said mixing chamber, the elastomeric material selected to be compatible with the materials being mixed;
  - an auger having a central shaft and mounted in said frame to convey materials through said mixing chamber;
  - mixing paddles mounted on the shaft of said auger;
  - a drive motor for said auger mounted on said frame;
  - a releasable flexible coupling between the aligned shafts of said motor and said auger to permit removal of said auger from said frame;
  - an inlet hopper to introduce substantially dry materials into said mixing chamber;
  - liquid injection means to introduce a liquid into said mixing chamber at a distance removed from said inlet hopper to have said substantially dry material form a plug to prevent the liquid and any fumes from backing up said inlet hopper; and
  - a discharge opening formed in said elastomeric trough.

The references relied on by the examiner are:

*Table set at this point is not available. See table in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.*

Claims 9 through 14 and 17 stand rejected as being directed to obvious subject matter within the meaning of 35 U.S.C. 103 in light of the teachings of Zimmerman in view of Wilkinson, Futti, Lasar, Clemens and Cunningham. The examiner contends that Zimmerman discloses the claimed subject matter except for "having the mixing chamber enclosed with a solid top frame and having a removable auger and having liquid injection means and aligned shafts between the motor and auger and a discharge formed in the elastomeric trough," (final rejection, page 2, paper number 5). The examiner cites Wilkinson as disclosing an enclosed mixing chamber

Page 973

where the enclosure comprises an inverted substantially U-shaped top frame portion and concludes that it therefore would be obvious to the artisan to modify the open frame in Zimmerman to be an enclosed mixing chamber as taught by Wilkinson "if desired." Since Wilkinson also discloses the concept of providing liquid injection means for the introduction of liquid into a mixing chamber remote from the inlet hopper, the examiner concludes that it would therefore be obvious to modify Zimmerman accordingly. Since Lasar discloses the concept of having an auger with mixing paddles mounted thereon wherein the auger is releasably coupled to a frame, the examiner concludes that it would have been obvious to the artisan to modify the auger in Zimmerman as taught by Lasar. Futti is cited to show that it is well known to provide coaxial alignment between an auger shaft and the shaft of a driving motor. Clemens is cited as disclosing the concept of having a discharge opening in a trough. The examiner concludes that it would have been obvious in light of Futti and Clemens to modify the auger motor alignment and discharge opening of Zimmerman to be of the nature suggested by Futti and Clemens.

Cunningham is cited as disclosing seal means to preclude leakage of the material within the mixing chamber. The examiner concludes that it would have been obvious in light of the teachings of Cunningham to employ seal means on the modified device of Zimmerman.

Claim 15 stands rejected as being directed to obvious subject matter under 35 U.S.C. 103 in light of the combined teachings of Zimmerman, Wilkinson, Fatty, Lasar, Clemens, Cunningham and August. Combining the teachings of Zimmerman, Wilkinson, Fatty, Lasar, Clemens and Cunningham in the manner specified supra, the examiner concludes that it would have been further obvious to the artisan in light of the teachings of August to provide spray elements with selectively activated controls since August teaches such devices to be known.

Claims 16, 18 and 19 stand rejected as being directed to obvious subject matter under 35 U.S.C. 103 in light of the combined teachings of Zimmerman, Wilkinson, Fatty, Lasar, Clemens, Cunningham and Tiemersma. Combining the teachings of Zimmerman, Wilkinson, Fatty, Lasar, Clemens and Cunningham in the manner specified supra, the examiner concludes that it would have been obvious to further modify the structure of Zimmerman to include a gas-filled bearing housing for sealing purposes.

Rather than reiterate the arguments of appellant and the examiner, reference is made to the brief and answer for the respective details thereof.

### Opinion

We will not sustain any of the rejections.

[1] Presuming arguendo that the references show the elements or concepts urged by the examiner, the examiner has presented no line of reasoning, and we know of none, as to why the artisan viewing only the collective teachings of the references would have found it obvious to selectively pick and choose various elements and/or concepts from the several references relied on to arrive at the claimed invention. In the instant application, the examiner has done little more than cite references to show that one or more elements or subcombinations thereof, when each is viewed in a vacuum, is known. The claimed invention, however, is clearly directed to a combination of elements. That is to say, appellant does not claim that he has invented one or more new elements but has presented claims to a new combination of elements. To support the conclusion that the claimed combination is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed combination or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. We find nothing in the references that would expressly or impliedly teach or suggest the modifications urged by the examiner. Additionally, as aforementioned, we find no line of reasoning in the answer, and we know of none, as to why the artisan would have found the modifications urged by the examiner to have been obvious. Based upon the record before us, we are convinced that the artisan would not have found it obvious to selectively pick and choose elements or concepts from the various references so as to arrive at the claimed invention without using the claims as a guide. It is to be noted that simplicity and hindsight are not proper criteria for resolving the issue of obviousness. Note *In re Horn*, 203 USPQ 969, 971 (CCPA 1979). Accordingly, we will not sustain any of the rejections presented.

The decision of the examiner rejecting claims 9 through 19 as being directed to obvious subject matter within the meaning of 35 U.S.C. 103 is reversed.

- End of Case -





**FULL TEXT OF CASES (USPQ FIRST SERIES)**

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**In re Burt and Walter**

**(CCPA)**

**148 USPQ 548**

**Decided Feb. 24, 1966**

**Appl. No. 7493**

**U.S. Court of Customs and Patent Appeals**

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**Headnotes**

**PATENTS**

**1. Patentability - Composition of matter (§ 51.30)**

In determining obviousness of composition, it is appropriate to consider, inter alia, such matters as (1) manner of preparation of composition vis a vis prior art, (2) structural similarities and differences between claimed composition and that of prior art, and (3) presence or absence of properties which would be unobvious in view of prior art; such a comparison as is involved in (1) will also be helpful in determining patentability of process for preparing product.

**2. Patentability - Invention - In general (§ 51.501)**

Nothing in reference suggests that specific polymers are impossible to prepare but neither does reference suggest that they can be prepared; silence in reference is not a proper substitute for adequate disclosure of facts from which conclusion of obviousness may justifiably follow.

**Particular patents-Polymers**

Burt and Walter, Polyether Polymers, claims 1 to 3, 5 to 7, 9, 11, 12, and 14 of application allowed.

**Case History and Disposition:**

## Appeal from Board of Appeals of the Patent Office.

Page 549

**Application for patent of James G. Burt and Henry C. Walter, Serial No. 713,538, filed Feb. 6, 1958; Patent Office Group 140. From decision rejecting claims 1 to 3, 5 to 7, 9, 11, 12, and 14, applicants appeal. Reversed.**

**Attorneys:**

**Robert C. Kline, Wilmington, Del. (Frederick Schafer, Washington, D.C., of counsel) for appellants.**

**Clarence W. Moore (Jack E. Armore of counsel) for Commissioner of Patents.**

**Judge:**

Before Worley, Chief Judge, and Rich, Martin, Smith, and Almond, Associate Judges.

### Opinion Text

**Opinion By:**

**Worley, Chief Judge.**

This appeal is from the decision of the Board of Appeals which affirmed the examiner's rejection of the claims in appellants' application <sup>1</sup> for "Polyether Polymers."

Claims 1 and 11 are representative:

1. A millable, sulfur-curable polyalkyleneether polymer having a molecular weight of at least about 30,000 and consisting essentially of the recurring units  $-(G-O)-$  where in G is a radical selected from the group consisting of an alkylene radical and a substituted alkylene radical wherein the substituents are free of any Zerewitinoff active hydrogen atoms and have a molecular weight of not greater than about 250, with the proviso that at least about one-third of the G's be tetramethylene radicals and that there be an average of at least one G for every 10,000 units of molecular weight of polymer, having a side chain which contains a non-aromatic, carbon-to-carbon unsaturated group, said side chain having a molecular weight of not greater than about 250.

11. A process for the preparation of a millable, sulfur-curable polyalkyleneether polymer having a molecular weight of at least about 30,000 which comprises reacting tetrahydrofuran with a compound selected from the group consisting of oxetanes, oxiranes and mixtures of both, in the presence of from 0.005 to 0.5 mol per cent of cationic polymerization catalyst based on the mols of cyclic ethers employed and at a temperature of from about -80 to 70°C., and recovering the resulting polyalkyleneether polymer; with the proviso that at least 33% mol per cent of said reactants be tetrahydrofuran and that at least one of said oxetanes or oxiranes have a side chain containing non-aromatic, carbon-to-carbon unsaturation so as to provide at least one of said side chains for every 10,000 units of molecular weight of polymer, said side chain having a molecular weight of not greater than about 250.

As evident from those claims, the application is directed to millable, sulfurcurable polyalkyleneether polymers which have side chains containing non-aromatic carbon-to-carbon unsaturated groups, and which have a minimum

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molecular weight of 30,000. The presence of at least one such side chain for each 10,000 units of molecular weight of the polymer permits curing or vulcanization of the polymer by sulfur according to well known procedures.

The polymers are prepared by polymerization of selected mixtures of substituted and unsubstituted cyclic ethers in the presence of a cationic catalyst at temperatures of  $-80^{\circ}$  to  $70^{\circ}$  C. At least 33% mol percent of the polymerizable reactants must invariably consist of unsubstituted tetrahydrofuran, a five-membered cyclic ether also known as tetramethylene oxide or 1,4-epoxybutane. The remaining cyclic ether reactants may be chosen from substituted or unsubstituted oxiranes (a three-membered cyclic ether also known as ethylene oxide or epoxide) and oxetanes (a four-membered cyclic ether also known as 1,3-propylene oxide or oxacyclobutane). While the substituted oxiranes or oxetanes utilized may contain a wide variety of side chain radicals free of active hydrogen atoms, sufficient amounts of those cyclic ethers which contain a carbon-to-carbon unsaturated group,

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, to yield the requisite number of sulfur curing sites must be employed. The cationic catalysts appellants utilize are of the Friedel-Craft type, such as phosphorous pentafluoride, antimony pentachloride and boron trifluoride. The products recovered after polymerization are described as soft, rubbery polymers.

The references are:

Pattison 2,808,391 October 1, 1957.

German Patent 914,438 July 1, 1954.

Pattison discloses certain elastomeric polyurethane polymers having side chains containing aliphatic  
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groups. The side chains, occurring at least once for every 8,000 units of molecular weight of the polyurethanes, serve as potential curing sites and the poly

Page 550

mer subsequently may be cured utilizing conventional sulfur curing procedures known to the rubber industry. In general, Pattison prepares his polyurethane polymers by reacting a polyalkyleneether glycol, an organic diisocyanate and a low molecular weight, nonpolymeric glycol (a chain extending agent), one or more of which contain an aliphatic carbon-to-carbon unsaturated group as a side chain. The following disclosure with respect to the nature of the polyalkyleneether glycols contemplated by Pattison is pertinent:

When preparing the polymers of the present invention by the reaction of glycols with diisocyanates, various high molecular weight, polymeric glycols, such as polyalkyleneether glycols, \* \* \* may be used. *These polymeric glycols should have molecular weights of at least 750; however, they may be as high as about 10,000.* In general, molecular weights of 750 to 5000 are preferred. It is to be understood that any of these polymeric glycols may have side chains containing aliphatic  
*Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.*

groups and when they do, the molecular weights will be increased in accordance with the molecular weights of the side chain groups.

In general, the polyalkyleneether glycols are preferred. These compounds may be represented by the formula  $\text{HO}(\text{GO})_n\text{H}$ , wherein G is an alkylene radical and  $n$  is an integer sufficiently large that the polyalkyleneether glycol has a molecular weight of at least 750. Not all of the alkylene radicals present need be the same. These compounds are ordinarily derived by the polymerization of cyclic ethers such as alkyleneoxides or dioxolane or by the condensation of glycols. The preferred polyalkyleneether glycol is

polytetramethyleneether glycol, also known as polybutyleneether glycol. Polyethyleneether glycol, polypropyleneether glycol, 1,2-polydimethylethyleneether glycol and polydecamethyleneether glycol are other typical representatives of this class. *Polyalkyleneether glycols having side chains which contain aliphatic C=C groups may be prepared by copolymerizing tetrahydrofuran with butadiene mono-oxide*<sup>2</sup> as more particularly described in German Patent No. 914,438. [Emphasis supplied.]

The German patent, which has been incorporated by reference into the disclosure of Pattison, is directed to preparation of tetrahydrofuran polymerization products. Those products are obtained by copolymerizing certain 1,2-epoxy compounds, such as ethylene oxide or epichlorohydrin, with tetrahydrofuran in the presence of various cationic polymerization catalysts of the Friedel-Craft variety, such as boron trifluoride or antimony pentachloride. The resultant products obtained from the copolymerization of tetrahydrofuran and mono-epoxides are described as viscous, oily liquids.

In initially rejecting the claims as unpatentable over Pattison alone, the examiner stated:

\* \* \* This reference discloses polyethers made by reacting tetrahydrofuran with an oxirane or an oxetane. \* \* \* Although Pattison 2,808,391 does not disclose polyethers of molecular weight 30,000 it would be obvious to one skilled in the art to increase the molecular weight.

In subsequent correspondence with appellants, it was the examiner's position that Pattison disclosed many material features of the claimed subject matter. As for the limitations not disclosed, he said:

\* \* \* The instant claims call for nothing more than a polyalkyleneether polymer having a molecular weight of 30,000 and having side chains with carbon-to-carbon unsaturation. This polymer, except for the molecular weight, is disclosed in Pattison. The term "mellable, sulfurcurable" does not change the fact that the polymer is a polyalkyleneether. It is deemed that the difference in molecular weight between the instant polymer and the Pattison polymer is one of degree and not of kind. \* \* \*

Up to that point, the examiner did not specially treat the subject matter of process claims 11, 12 and 14, or point out to appellants wherein the specific limitations therein were disclosed by, or obvious from, Pattison alone. However, in his answer to appellants' brief before the board, the examiner noted that Pattison incorporated German by reference, stating:

\* \* \* The German reference is relied on to show the particular *reac*

Page 551

tion conditions of applicants' method claims which are (1) proportions of reactants, (2) catalyst and (3) temperature. The particular reactants are shown by Pattison.

Developing his position further, the examiner said:

\* \* \* the instant claims on appeal are directed to a "mellable, sulfur curable" polyalkylene-ether polymer. The examiner regards this preamble phrase as a mere statement of intention or desired result and further it fails to recite positive action steps. Consequently it is given little weight and certainly patentability could not be predicated upon this preamble clause.

Now to the principal issue of whether the 30,000 M.W. polymer is patentable over a 10,000 M.W. polymer of the same composition. \* \* \* As a matter of background it is considered a general rule in polymer chemistry that a high molecular weight solid polymer is patentable over the same low molecular weight viscous or liquid polymer. Likewise a 50,000 or more molecular weight *solid* polymer may be patentable over a 1,000-5,000 molecular weight solid polymer. The rationale is presumably that a radical departure from the prior art in process and/or utility sustains the patentability. \* \* \* In the instant case the difference is 10,000 v. 30,000. When considering the patentability of like compositions of matter differing in molecular weight, some of the tests of patentability applied by the examiner are (1) the history of the art; was there difficulty encountered by prior workers in obtaining a high molecular weight polymer now being

claimed? and (2) comparison of the process steps of the reference with applicants' process steps. In considering a history of the art approach, nothing in Pattison suggests that polyalkylene-ether polymers of over 10,000 M.W. are impossible to prepare. \* \* \* Additionally the applicants have submitted no argument or exhibit showing the impossibility of preparing the 30,000 M.W. polymer prior to applicants' alleged invention.

Primary reliance was placed on a comparison of appellants' and German's process steps to demonstrate obviousness of the claimed process and product. The examiner found appellants' particular reactants, amounts of reactants, catalyst materials and temperature ranges all disclosed by German or Pattison, and noted he could \* \* \* find no process step or a reaction condition in method claims 11, 12 and 14 not taught by the German patent and this evidence is given substantial weight in finding a lack of unobviousness in the product claims.

It appears that Pattison desired to halt the polymerization at a certain molecular weight so that a diisocyanate could be added, therefore it is probable that a longer reaction time would produce a higher molecular weight polymer. However this is not relied on as conclusive in finally determining patentability. In its decision, the board said:

\* \* \* no general rules can be drawn as to the relationship between numerical differences in molecular weight of polymeric materials and the patentability of claims manifesting a different molecular weight from a prior art polymer. It is apparent that mere novelty, as indicated by a failure of the prior art to expressly refer to polymers of a specific average molecular weight, does not establish by itself that a polymer is unobvious from the prior art. In determining whether a particular polymer is obvious it is proper to consider such facts as the polymer's manner of preparation and the presence or absence of properties which would have been unexpected from the prior art.

The board regarded an affidavit submitted by appellants to provide "dubious evidence" of their contention that polyalkyleneether glycols of 10,000 molecular weight and having unsaturated side chains are not millable or sulfur-curable. In addition, it noted the term "millable" in the claims is not limited to any certain degree of difficulty.

As to the process claims, the board agreed with the examiner that the German patent indicates "preparation of polyalkyleneether glycols presented no technical problem" and that there is nothing to suggest that the claimed process "involves a substantial or unobvious departure" from that suggested by the reference combination.

[1] We have quoted extensively from the opinion of the examiner and board in order to present a clear picture of their reasoning. We agree with their general approach to the problem, and think that it is appropriate in determining obviousness of a composition to consider, inter alia, such matters as (1) the manner of preparation of the composition vis a vis the prior art, (2) the structural similarities as well as differ

Page 552

ences between the claimed composition and that of the prior art, and (3) the presence or absence of properties which would be unobvious in view of the prior art. Necessarily such a comparison as is involved in (1) will also be helpful in determining the patentability of the process for preparing the product. We disagree, however, with the conclusion of obviousness derived from the facts shown by this record.

### **The Process Claims**

While both the examiner and board recognized that the respective processes carried out by the prior art and appellants produced products of different molecular weight, viz, appellants' average polymer chain was three times heavier (or longer) than Pattison's or German's, they shared the view that few, if any, of the process steps and limitations were not shown by those references. Thus Pattison was found to disclose that polyalkyleneether glycols of less than 10,000 molecular weight, and containing unsaturated side chains, could be prepared by

reacting tetrahydrofuran and butadiene monooxide (a substituted oxirane within the scope of the claims). Pattison referred to German for a disclosure of how to prepare that product. German, in turn, was found to suggest appellants' temperature range, cationic catalyst materials, and ratios of tetrahydrofuran and substituted oxirane or oxetane reactants. We agree with those findings of fact and accept them as far as they go. However, as the examiner acknowledged, "a higher molecular weight polymer obtained from the same reactants used to prepare the lower molecular weight polymer must certainly involve changes in process conditions, if any changes do occur." What, then, are the changes over the prior art which enable appellants to prepare a polymer of greater than 30,000 molecular weight?

At this point it is appropriate to review what appellants' specification says with regard to the process conditions necessary to prepare a polyalkyleneether polymer of 30,000 molecular weight:

When preparing these polyether polymers, the extent of polymerization as reflected by the inherent viscosity of the polymer depends upon the temperature at which polymerization is effected and the particular catalyst used and its concentrations. In general, the lower the concentration of the catalyst, the higher the molecular weight of the resulting polyether polymer. Also, when the reaction temperature is higher, the molecular weight of the resulting polyether polymer will be lower. \* \* \*

The catalyst concentration should be in the range of 0.005 to 0.5 mol per cent, based on the total mols of cyclic ethers to be polymerized. \* \* \* The inherent viscosities of the polymers prepared at relatively high catalyst concentrations tend to lower values than desired.

\* \* \* The soluble polymers of this invention have inherent viscosities of at least 1.0, when determined on 0.1% solutions in benzene at 30° C. These inherent viscosities correspond to molecular weights of at least about 30,000. Polymers having lower inherent viscosities tend to be too soft and sticky, and thus are difficult to mill and process in conventional equipment. All the polyether polymers of this invention are millable and processable in conventional equipment of the rubber industry \* \* \*.

Appellants challenge the examiner's statement that there was "no process step or a reaction condition in method claims 11, 12 and 14 not taught by the German patent," as well as the board's finding that the temperature and catalyst concentrations recited in appellants' claims were not "critically distinct from temperatures and catalyst concentrations of the German patent." While we agree with the examiner and board that the temperature range of -80° C to 70° C recited in the claims is amply disclosed by German, we must also agree with appellants that nowhere in German or in Pattison is there any disclosure of the quantity of catalyst required to produce a polyalkyleneether polymer of 30,000 molecular weight.<sup>3</sup> Nor did the examiner or board find as a fact that one of ordinary skill in the art would expect from his knowledge of analogous cationic polymerization reactions and kinetics in general that utilization of a lower concentration of catalyst in the present process would produce a substantially higher molecular weight product than either German or Pattison were able to produce. We think appellants' specification makes it abundantly clear that the claimed catalyst concentration is necessary to produce their particular polymer product. While the

Page 553

German patent may suggest that preparation of polyalkyleneether glycols of 10,000 molecular weight presents no "technical problem," we fail to find a suggestion therein that appellants' claimed process involves merely an obvious departure from the prior art. There being insufficient evidence in the record as a whole to sustain the board's conclusion as to obviousness of appellants' process, its decision is reversed.

### **The Composition of Matter Claims**

The issue here is whether millable, sulfur-curable polyalkyleneether polymers having a minimum molecular weight of 30,000 are patentable over the prior art which discloses a similar polyalkyleneether having a molecular weight no greater than 10,000 and is silent as to the "millable" and "sulfur-curable" properties of that material. In

resolving that issue, we shall consider, seriatim: (1) whether the prior art suggests that the particular polyalkyleneether polymers of claim 1 which have a molecular weight of 30,000 may be prepared by *any* particular method, (2) whether the prior art suggests the particular structure of those polymers, and (3) whether the prior art suggests the particular properties possessed by those polymers.

We have already found appellants' particular process for producing their polymers unobvious in view of Pattison and German. The question remains whether those references suggest that appellants' polymers may be produced by other methods.

The examiner thought it probable that employment of a longer reaction time in the process disclosed by Pattison and German would produce a higher molecular weight polymer. The board did not comment on that contention. We think the record contradicts the examiner's position, since a comparison of the specific examples in appellants' specification and in German shows that comparable reaction times of the order of 24 hours were utilized by both parties.<sup>4</sup> It would seem that something more than mere time governs the molecular weight of the polymer produced by the respective processes.

[2] The examiner noted that "nothing in Pattison suggests that polyalkylene-ether polymers of *over* 10,000 M.W. are impossible to prepare" and that appellants had "submitted no argument or exhibit showing the impossibility of preparing the 30,000 M.W. polymer" prior to appellants' invention. While those observations are undoubtedly true, we might add that neither do the references suggest that those polymers can be prepared. Silence in a reference is hardly a proper substitute for an adequate disclosure of facts from which a conclusion of obviousness may justifiably follow.

Turning to the structure of the instant polymer, we agree with the Patent Office that the nature of "G" in the repeating unit (-G-O-) as defined in product claim 1 is rendered obvious by Pattison in view of German. We cannot agree, however, that those references suggest a polymer structure which is three times the weight or length disclosed by Pattison as the maximum desirable for use in preparing his particular polyurethane polymers. We question whether one of ordinary skill in the art, upon reading Pattison and German, would be apprised of the desirability of a heavier or longer polymer chain length.

Finally, appellants argue that their polymers have the properties of being "millable" and "sulfur-curable," and that those properties are not possessed by the Pattison polyalkyleneether glycol polymers of lower molecular weight. Although we share the view of the board that one of ordinary skill would expect the Pattison polymeric glycols to be "sulfur-curable," i.e. react with sulfur, because of the presence of unsaturated *Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.*

groups in the side chains, we are unwilling to conclude that the oily, viscous liquid polymers of Pattison or German, having a molecular weight of less than 10,000, are indeed "millable" in the sense intended by appellants. Appellants' specification makes it clear that polymers having a lower molecular weight than 30,000 tend to be "too soft and sticky" to be millable in conventional equipment. We regard appellants' affidavit, to the ef

Page 554

fect that certain copolymers having the repeating unit structure set forth in the claims and having a molecular weight of 10,000 were "too fluid to be handled on a rubber mill," as corroboration of the disclosure in their specification. We think the record supports appellants' contention that the term "millable" applied to the present polymers is an expression which, when considered with the associated molecular weight of the material, is a significant property difference demonstrating lack of obviousness over the prior art.

When all the foregoing factors are considered, we are satisfied that a conclusion of obviousness of the claimed products is also without sufficient foundation in the record. The decision is *reversed*.

## Footnotes

Footnote 1. Serial No. 713,538, filed February 6, 1958. Claims 1-3, 5-7, 9, 11, 12 and 14 are on appeal.

Footnote 2. That particular polyalkyleneether glycol would contain "G" units, as set forth in Patterson's formula, consisting of tetramethylene radicals ( $-\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2-$ ) and radicals derived from 1,2-butadiene monoxide

*Graphic material consisting of a chemical formula or diagram set at this point is not available. See text in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.*

Footnote 3. In the relevant examples of German, catalyst concentrations of about 0.65% to 1.0% (in mol% based on total mols of cyclic ether) are employed to produce oily liquid polymerization products.

Footnote 4. The record demonstrates that the polymerization process disclosed by German proceeds by way of a ring scission of the cyclic ether reactants to form carbonium or oxonium ions. The formation of the polymer chain through an ionic mechanism proceeds in a manner akin in a kinetic sense to typical *addition* or chain-reaction polymerizations. The passage of time in addition polymerization affects ultimate yield, but generally has little effect on the degree of polymerization (molecular weight). In *condensation* or step-reaction polymerizations, on the other hand, longer reaction times generally will provide higher molecular weight polymer products. While we note that Pattison does disclose that his polyalkyleneether glycols may be prepared by condensation of suitable glycols with consequent splitting off of water, it is apparent that neither the examiner nor the board relied on that disclosure as a basis for their rejection.

- End of Case -





FULL TEXT OF CASES (USPQ FIRST SERIES)

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**W.L. Gore & Associates, Inc. v. Garlock, Inc.**

**(CA FC)**

**220 USPQ 303**

**Decided Nov. 14, 1983**

**Nos. 83-613/614**

**U.S. Court of Appeals Federal Circuit**

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**Headnotes**

**PATENTS**

**1. Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)**

Parties' argument relating to salutary injunction of FRCivP 52(a) cannot be controlling on all issues, where dispositive legal error occurred in interpretation and application of patent statute, 35 USC.

**2. Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)**

Findings that rest on erroneous view of law may be set aside on that basis.

**3. Construction of specification and claims -- Claim defines invention (§ 22.30)**  
Claims measure and define invention.

**4. Construction of specification and claims -- Combination claims (§ 22.35)**

**Infringement -- Process patents (§ 39.65)**

Court's restriction of claimed multi-step process to one step constitutes error, whether done at behest of patentee relying on that restriction to establish infringement by one who

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employs only that one step in process otherwise distinct, or at behest of accused infringer relying on that restriction to establish invalidity by showing that one step in prior art process otherwise distinct; invention must be considered as whole.

**5. Court of Appeals for the Federal Circuit -- Weight given decision reviewed (§ 26.59)**

CAFC is not at liberty to substitute its own for district court's findings underlying district court's conclusion that claim is invalid.

**6. Patentability -- Anticipation -- Process (§ 51.225)**

It is irrelevant that those using invention may not have appreciated results where patent owner's operation of device is consistent, reproducible use of claimed invention; were that alone enough to prevent anticipation, it would be possible to obtain patent for old and unchanged process.

**7. Use and sale -- Extent and character of use (§ 69.5)**

Nonsecret use of claimed process in usual course of producing articles for commercial purposes is public use.

**8. Use and sale -- Extent and character of use (§ 69.5)**

Patentees' commercialization of product produced by its patented process can result in forfeiture of patent granted them for that process on application filed by them more than one year later; however, third party secret commercialization of process cannot be bar to patent grant on that process.

**9. Patent grant -- Intent of patent laws (§ 50.15)**

Early public disclosure is linchpin of patent system.

**10. Interference -- Priority (§ 41.70)**

Law disfavors prior inventor who benefits from process by selling its product but suppresses, conceals, or otherwise keeps process from public, as against later inventor who promptly files patent application from which public will gain disclosure of process.

**11. Patentability -- Evidence of -- In general (§ 51.451)**

District court that in its consideration of prior art disregarded unpredictability and unique nature of product to which claimed inventions relate errs.

**12. Construction of specification and claims -- By prior art (§ 22.20)**

District court that in its consideration of prior art considers claims in less than their entireties errs.

**13. Patentability -- Evidence of -- Suggestions of prior art (§ 51.469)**

District court that considers references in less than their entireties, i.e., in disregarding disclosures in references that diverge from and teach away from invention at hand, errs.

**14. Construction of specification and claims -- Comparison with other claims (§ 22.40)**

Claims must be considered individually and separately.

**15. Patentability -- Anticipation -- Combining references (§ 51.205)**

There must have been something present in teachings in references to suggest to one skilled in art that claimed invention before court would have been obvious.

**16. Patentability -- Evidence of -- Suggestions of prior art (§ 51.469)**

Fact that patentee proceeded contrary to accepted wisdom of prior art is strong evidence of nonobviousness.

**17. Patentability -- Tests of -- Skill of art (§ 51.707)**

Imbuing one of ordinary skill in art with knowledge of invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to insidious effect of hindsight syndrome wherein that which only inventor taught is used against its teacher.

**18. Patentability -- Invention -- In general (§ 51.501)****Patentability -- Tests of -- Skill of art (§ 51.707)**

Decisionmaker must forget what he or she has been taught at trial about claimed invention and cast mind back to time invention was made to occupy mind of one skilled in art who is presented only with references, and who is normally guided by then-accepted wisdom in art.

**19. Pleading and practice in courts -- Burden of proof -- Validity (§ 53.138)****Presumption for patent grant -- Patent Office consideration of prior art (§ 55.5)**

It is not law that presumption of validity is weakened greatly where Patent Office has

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failed to consider pertinent prior art; presumption has no separate evidentiary value; it cautions decisionmaker against rush to conclude invalidity; submission of additional art that is merely "pertinent" does not dispel that caution; however, inescapable burden of persuasion on one who would prove invalidity remains throughout trial.

## **20. Pleading and practice in courts -- Burden of proof -- Validity (§ 53.138)**

### **Presumption from patent grant -- Patent Office consideration of prior art (§ 55.5)**

Burden of proving invalidity may be facilitated by prior art that is more pertinent than that considered by PTO.

## **21. Patentability -- Evidence of -- In general (§ 51.451)**

District court that specifically declines to consider objective evidence of nonobviousness errs; that evidence can often serve as insurance against insidious attraction of siren hindsight when confronted with difficult task of evaluating prior art; even when prior art evidence points more in direction of nonobviousness than obviousness, objective evidence may tend to reassure decisionmaker.

## **22. Patentability -- Anticipation -- In general (§ 51.201)**

Anticipation requires disclosure in single prior art reference of each element of claim under consideration.

## **23. Patentability -- Anticipation -- Process (§ 51.225)**

### **Patentability -- Composition of matter (§ 51.30)**

Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting characteristics of products that might result from practice of processes disclosed in references.

## **24. Patentability -- Anticipation -- Infringement as test (§ 51.211)**

Accused infringer's employment of process of dominating patent is not anticipation of invention described and claimed in improvement patent.

## **25. Patentability -- Anticipation -- In general (§ 51.201)**

### **Patentability -- Invention -- In general (§ 51.501)**

Inherency and obviousness are distinct concepts.

**26. Patentability -- Evidence of -- In general (§ 51.451)**

All evidence bearing on obviousness issue, as with any other issue raised in conduct of judicial process, must be considered and evaluated before required legal conclusion is reached.

**27. Patentability -- Evidence of -- In general (§ 51.451)**

Objective evidence of nonobviousness, i.e., "indicia" of *Graham v. John Deere Co.*, 148 USPQ 459, may in given case be entitled to more weight or less, depending on its nature and its relationship to invention's merits; it may be most pertinent, probative, and revealing evidence available to aid in reaching conclusion on obvious/nonobvious issue.

**28. Patentability -- Evidence of -- Commercial success -- In general (§ 51.4551)**

Praise greeting products claimed in patent from suppliers, including owner of prior art patent, is objective evidence of nonobviousness.

**29. Patentability -- Composition of matter (§ 51.30)**

Claim to new product is not required to include critical limitations.

**30. Specification -- Sufficiency of disclosure (§ 62.7)**

Patents are written to enable those skilled in art to practice invention, not public, and Section 112 speaks as of application filing date, not as of time of trial.

**31. Specification -- Sufficiency of disclosure (§ 62.7)**

Section 112 requires that inventor set forth best mode of practicing invention known to him at time application was filed.

**32. Claims -- Indefinite -- In general (§ 20.551)**

Use of "stretching at rate exceeding specific percent per second" in claims is not indefinite.

**33. Claims -- Specification must support (§ 20.85)**

It is claimed invention for which enablement is required.

**34. Specification -- Sufficiency of disclosure (§ 62.7)**

Patent is not invalid merely because some experimentation is needed; patent is invalid only when those skilled in art are required to engage in undue experimentation to practice invention.

**35. Construction of specification and claims -- Claim defines invention  
(§ 22.30)**

Distinguishing what infringes from what does not is role of claims, not of specification.

**36. Construction of specification and claims -- Defining terms (§ 22.45)**

Patent applicant can be his own lexicographer.

**37. Defenses -- Fraud (§ 30.05)**

Fraud must be shown by clear and convincing evidence; state of mind of one making representations is most important of elements to be considered in determining existence of fraud; good faith and subjective intent, while they are to be considered, should not necessarily be made controlling; under ordinary circumstances, fact of misrepresentation coupled with proof that party making it had knowledge of its falsity is enough to warrant drawing inference that there was fraudulent intent; where public policy demands complete and accurate disclosure it may suffice to show nothing more than that misrepresentations were made in atmosphere of gross negligence as to their truth.

**38. Pleading and practice in courts -- Issues determined -- Validity and infringement (§ 53.505)**

Better practice is for district court to decide both validity and infringement issues when both are contested at trial, enabling conduct of single appeal and disposition of entire case in single appellate opinion.

**39. Infringement -- Tests of -- Comparison with claim (§ 39.803)**

Infringement is decided with respect to each asserted claim as separate entity.

**Particular patents -- Porous Products**

3,953,566, Gore, Process for Producing Porous Products, holding of invalidity of claims 3 and 19 reversed and of claims 1 and 17 affirmed.

4,187,390, Gore, Porous Products and Process Therefor, holding of invalidity reversed.

**Case History and Disposition:**

**Appeal from District Court for the Northern District of Ohio, Manos, J.; 220 USPQ 220 .**

**Consolidated actions by W. L. Gore & Associates, Inc., against Garlock, Inc., for patent infringement, in which defendant counterclaims for declaratory judgment of patent invalidity, noninfringement, fraudulent solicitation, and entitlement to attorney fees. From judgment for defendant, plaintiff appeals and defendant cross-appeals. Affirmed in part, reversed in part, and remanded; Davis, Circuit Judge, concurring in result in part and dissenting in part, with opinion.**

**Attorneys:**

**David H. Pfeffer, New York, N.Y. (J. Robert Dailey and Janet Dore, both of New York, N.Y., and John S. Campbell, Newark, Del., of counsel) for appellant.**

**John J. Mackiewicz, Philadelphia, Pa. (Dale M. Heist, Philadelphia, Pa., on the brief, Bernard Ouziel, New York, N.Y., of counsel) for appellee.**

**Judge:**

**Before Markey, Chief Judge, and Davis and Miller, Circuit Judges.**

### **Opinion Text**

**Opinion By:**

**Markey, Chief Judge.**

Appeal from a judgment of the District Court for the Northern District of Ohio holding U.S. Patents 3,953,566 ('566) and 4,187,390 ('390) invalid. We affirm in part, reverse in part, and remand for a determination of the infringement issue.

### **Background**

Tape of unsintered polytetrafluorethylene (PTFE) (known by the trademark TEFLON of E.I. du Pont de Nemours, Inc.) had been stretched in small increments. W. L. Gore & Associates, Inc. (Gore), assignee of the patents in suit, experienced a tape breakage problem in the operation of its "401" tape stretching machine. Dr. Robert Gore, Vice President of Gore, developed the invention disclosed and claimed in the '566 and '390 patents in the course of his effort to solve that problem. The 401 machine was disclosed and claimed in Gore's U.S. Patent 3,664,915 ('915) and was the invention of Wilbert L. Gore, Dr. Gore's father. PTFE tape had been sold as thread seal tape, i.e., tape used to keep pipe joints from leaking. The '915 patent, the application for which was filed on

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October 3, 1969, makes no reference to stretch rate, at 10% per second or otherwise, or to matrix tensile strength in excess of 7,300 psi.

Dr. Gore experimented with heating and stretching of highly crystalline PTFE rods. Despite slow, careful stretching, the rods broke when stretched a relatively small amount. Conventional wisdom in the art taught that breakage could be avoided only by slowing the stretch rate or by decreasing the crystallinity. In late October 1969, Dr. Gore discovered, contrary to that teaching, that stretching the rods as fast as possible enabled him to stretch them to more than ten times their original length with no breakage. Further, though the rod was thus greatly lengthened, its diameter remained virtually unchanged throughout its length. The rapid stretching also transformed the hard, shiny rods into rods of a soft, flexible material.

Gore developed several PTFE products by rapidly stretching highly crystalline PTFE, including: (1) porous film for filters and laminates; (2) fabric laminates of PTFE film bonded to fabric to produce a remarkable material having the contradictory properties of impermeability to liquid water and permeability to water vapor, the material being used to make "breathable" rainwear and filters; (3) porous yarn for weaving and braiding into other products, like space suits and pump packing; (4) tubes used as replacements for human arteries and veins; and (5) insulation for high performance electric cables.

Page 307

On May 21, 1970, Gore filed the patent application that resulted in the patents in suit. The '566 patent has 24 claims directed to processes for stretching highly crystalline, unsintered, PTFE. The processes, inter alia, include the steps of stretching PTFE at a rate above 10% per second and at a temperature between about 35°C and the crystalline melt point of PTFE. The '390 patent has 77 claims directed to various products obtained by processes of the '566 patent.

It is effectively undisputed that the present inventions filled a long sought yet unfilled need. The United States Army and the research director of a Garlock Inc. (Garlock) customer had been looking for and following up every remote lead to a waterproof/breathable material for many years.

It is undisputed that the present inventions enjoyed prompt and remarkable commercial success due to their merits and not to advertising or other extraneous causes.

It is undisputed that the inventions provide the most important synthetic material available for use in vascular surgery, hundreds of thousands of persons having received artificial arteries formed of the patented products since 1976, and that the patented products have unique properties useful in other medical procedures, in communications satellites, radar systems, and electrical applications.

It is undisputed that the major sources of PTFE, ICI and du Pont, greeted the patented products as "magical," "bewitching," "a remarkable new material," and one that "differs from other processed forms of Teflon."

It is undisputed that the patented products were met with skepticism and disbelief by at least one scientist who had worked with PTFE at du Pont for many years and who testified as an expert at trial.

It is undisputed that Garlock first produced an accused product in response to a customer's request for a substitute for the patented product, that Garlock advertised its accused product as a "new form" of PTFE and as "a versatile new material which provides new orders of performance for consumer, industrial, medical and electrical applications," and that the customer describes that accused product as "a new dimension in rainproof/breathable fabrics."

### ***Proceedings***

On Nov. 2, 1979, Gore sued Garlock for infringement of process claims 3 and 19 of the '566 patent, and sought injunctive relief, damages and attorney fees. Garlock counterclaimed on Dec. 18, 1979, for a declaratory judgment of patent invalidity, non-infringement, fraudulent solicitation, and entitlement to attorney fees. On Feb. 7, 1980, Gore filed a second suit for infringement of product claims 14, 18, 36, 43, 67 and 77 of the '390 patent. In light of a stipulation, the district court consolidated the two suits for trial.

Gore alleged infringement of certain claims by certain products:

*Table set at this point is not available. See table in hard copy or call BNA PLUS at 1-800-452-7773 or 202-452-4323.*

At trial, Garlock addressed only claims 1, 3, 17, and 19 of the '566 patent and claims 1, 9, 12, 14, 18, 35, 36, 43, 67 and 77 of the '390 patent. See Appendix to this opinion.

The district court, in a thorough memorandum accompanying its judgment, and in respect of the '566 patent: (1) found claim 1 anticipated under 35 U.S.C. §102(a) by Gore's use of its 401 machine and use by the Budd Company (Budd) of a Cropper machine; (2) declared all claims of the patent invalid under 102(b) because the invention had been in public use and on sale more than one year before Gore's patent application, as evidenced by Budd's use of the Cropper machine; (3) held claims 1, 3, 17 and 19 invalid for obviousness under 35 U.S.C. §103, on the basis of various reference pairings: (a) Japanese patent 13560/67 (Sumitomo) with U.S. patent 3,214,503 (Markwood); (b) U.S. patent 2,776,465 (Smith) with Markwood; or (c) Gore's '915 patent with Sumitomo; and (4) held all claims invalid as indefinite under 35 U.S.C. §112.<sup>1</sup>

Page 308

In its opinion respecting the '390 patent, the district court held: (1) claims 1, 9, 12, 14, 18, 35, 36, 43, 67 and 77 invalid §§102 and 103 in view of Sumitomo and Smith; and (2) all claims invalid as indefinite under §112.

The court found that Gore did not commit fraud before the Patent and Trademark Office (PTO), denied Garlock's request for attorney fees, and refrained from deciding the infringement issue.

### ***Issues***

Did the district court err in: (1) its holding of invalidity under §§102(a), 102(b), 103 and 112; (2) its finding that Gore did not commit fraud on the PTO; or (3) denying attorney fees.

## Opinion

This hard fought and bitterly contested case involved over two years of discovery, five weeks of trial, the testimony of 35 witnesses (19 live, 16 by deposition), and over 300 exhibits. The district court issued an exhaustive 37-page memorandum opinion reflective of a careful, conscientious approach to the determination of the many issues presented at trial.

The record on appeal consists of 2000 pages. The parties' briefs total 199 pages. In those briefs, counsel repeatedly accuse each other of numerous and serious breaches of the duty of candor owed the court. Each cites instances in which the testimony, the findings, and the record are or are said to be quoted in part and out of context. As a result, the usefulness and reliability of the briefs as means of informing the court has been greatly diminished if not destroyed, and careful, time-consuming study of all exhibits and each page of the record has been required.

Appellant cited 80 prior court opinions in its main brief. Appellee's brief totally ignores all but two of those citations, but adds 57 more. Appellant's reply brief cites 126 prior court opinions, 34 earlier cited, 67 newly cited, and 25 of those cited by appellee. Appellee's reply brief cites 17 prior court opinions, 4 earlier cited, 7 newly cited, and 6 of the 147 cited by appellant. Accordingly, 211 prior court opinions have been evaluated in relation to the proof found in the record.

In light of the entire record and the applicable law, we are convinced that Garlock failed to carry its burden of proving all claims of the present patents invalid.

### ***Standard of Review***

[1]

[2] Where, as here, dispositive legal error occurred in interpretation and application of the patent statute, 35 U.S.C., the parties' arguments relating to the salutary injunction of Fed.RuleCiv.P. 52(a) cannot be controlling on all issues. Findings that "rest on an erroneous view of the law may be set aside on that basis," *Pullman-Standard v. Swint*, 456 U.S. 273 (1982). Thus it is unnecessary here to set aside any probative fact found by the district court on the basis of its being clearly erroneous, or to engage in what would be an inappropriate reweighing of the facts.

Among the legal errors extant in the record, each of which is discussed below, are (1) the invention set forth in each claim was not in each instance considered as a whole; (2) 35 U.S.C. §102(b) was applied though criteria for its application were not present; (3) the references were not assessed in their entireties; (4) an inherency theory under §§102 and 103 was inappropriately applied; (5) that which only the inventor taught was attributed to the prior art; (6) individual steps in prior art processes dealing with materials distinct from those with which the present inventions dealt were erroneously equated to steps in the claimed processes; (7) objective evidence of nonobviousness was disregarded; and (8) the function and application of §112 were misconstrued.

Because it permeated so much of the district court's analysis, we note more fully its frequent restriction of its consideration to 10% per second rate of stretching, which it called the "thrust of the invention." That approach is repeated throughout Garlock's briefs, which refer repeatedly to the "thrust of the invention," to "the inventive concept," and to the claims "shorn of their extraneous limitations." That facile focusing on the

"thrust," "concept," and "shorn" claims, resulted in treating the claims at many points as though they read differently from those actually allowed and in suit.

Page 309

[3] It is true that Dr. Gore emphasized rapid stretching, for example, as well as the amount of stretch and other process limitations, during prosecution of the application for the '566 patent. Yet it is the claims that measure and define the invention. *Aro Manufacturing Co. v. Convertible Top Replacement Co.*, 365 U.S. 336, 339, 128 USPQ 354 (1961); *Bowser, Inc. v. U.S.*, 388 F.2d 346, 349, 156 USPQ 406, 409 (Ct. Cl. 1967).

[4] Each claimed invention must be considered as a whole. 35 U.S.C. §103; *Schenck, A.G. v. Nortron Corp.*, 218 USPQ 698, 700 (Fed. Cir. 1983). In determining obviousness, there is "no legally recognizable or protected 'essential,' 'gist,' or 'heart' of the invention." *Aro*, 365 U.S. at 345. A court's restriction of a claimed multi-step process to one step constitutes error, whether done at the behest of a patentee relying on that restriction to establish infringement by one who employs only that one step in a process otherwise distinct, or at the behest of an accused infringer relying on that restriction to establish invalidity by showing that one step in a prior art process otherwise distinct.

### **( 1) Invalidity**

#### **( a) '566 Patent**

##### **( i) §102(a) and The 401 Machine**

It is undisputed that the district court held only claim 1 of the '566 patent to have been anticipated under §102(a) by operation of the 401 machine in the Gore shop before Dr. Gore's invention in late October 1969. It did so on the deposition testimony of two former Gore employees, documents, and drawings of the 401 machine.

In August 1969, Gore offered to sell to Export Tool Company (Export) tape "to be made" on the 401 machine. Tape made on the 401 machine was shipped to Export on October 24, 1969. The trial judge found the rolls on the 401 machine were, at least at some point in time before October 1969, spaced less than four feet apart and that the rate of stretch accomplished in operating that machine (admittedly operated in accord with the description of machine operation in the '915 patent) must have been greater than 10% per second. The district court credited testimony that Teflon 6-c, a highly crystalline form of Teflon, was used because it was the standard resin at the time, and that the tape was stretched at a temperature above 35°C. Thus it cannot be said that the record fails to support the district court's finding that the limitations of claim 1 were met by Gore's operation of the 401 machine before Dr. Gore's asserted "late October 1969" date of invention. Though he was working with the operation of the 401 machine, Dr. Gore offered no proof that his invention date was before the date of shipment to Export.

[5] Gore, seeking a review here of the evidence, points to certain inadequacies as indicating a failure to meet the required clear and convincing standard under §102(a). At the time of trial, the district court, bound by precedent then applicable, applied a preponderance of the evidence test. Gore asserts, erroneously, that the clearly erroneous standard does not therefore apply on this appeal. Gore does not, however, point to any

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basis on which the district court's findings must be held to have been clearly erroneous under the clear and convincing standard. We are not at liberty, of course, to substitute our own for the district court's findings underlying its conclusion that claim 1 is invalid.

[6] Gore's operation of the 401 machine must thus be viewed as a consistent, reproducible use of Dr. Gore's invention as set forth in claim 1, and it is therefore irrelevant that those using the invention may not have appreciated the results. *General Electric Co. v. Jewel Incandescent Lamp Co.*, 326 U.S. 242, 248, 67 USPQ 155, 157-58 (1945). Were that alone enough to prevent anticipation, it would be possible to obtain a patent for an old and unchanged process. *Ansonia Brass & Copper Co. v. Electric Supply Co.*, 144 U.S. 11, 18 (1892); see, *H.K. Regar & Sons, Inc. v. Scott & Williams, Inc.*, 63 F.2d 229, 231, 17 USPQ 81, 83 (2d Cir. 1933).

[7] The nonsecret use of a claimed process in the usual course of producing articles for commercial purposes is a public use. *Electric Storage Battery Co. v. Shimadzu*, 307 U.S. 5, 20, 41 USPQ 155, 161 (1939), and there was no evidence that any different process was used to produce the articles shipped to Export.

Thus it cannot be said that the district court erred in determining that the invention set forth in claim 1 of '566 patent was known or used by others under §102(a), as evidenced by Gore's operation of the 401 machine before Dr. Gore's asserted date of that invention.

In view of our affirmance of the judgment reached on claim 1 under 102(a), we need not discuss other asserted grounds of invalidity of claim 1. There was, however, no evidence whatever that the inventions set forth in other claims, of either the '566 or the '390 patent, were known or used by others as a result of Gore's operation of the 401 machine before late October 1969.

Page 310

### ***( ii) §102(b) and the Cropper Machine***

In 1966 John W. Cropper (Cropper) of New Zealand developed and constructed a machine for producing stretched and unstretched PTFE thread seal tape. In 1967, Cropper sent a letter to a company in Massachusetts, offering to sell his machine, describing its operation, and enclosing a photo. Nothing came of that letter. There is no evidence and no finding that the present inventions thereby became known or used in this country.

In 1968, Cropper sold his machine to Budd, which at some point thereafter used it to produce and sell PTFE thread seal tape. The sales agreement between Cropper and Budd provided:

### **ARTICLE "E" - PROTECTION OF TRADE SECRETS Etc.**

1. *BUDD* agrees that while this agreement is in force it will not reproduce any copies of the said apparatus without the express written permission of Cropper nor will it divulge to any person or persons other than its own employees or employees of its affiliated corporations any of the said known-how or any details whatsoever relating to the apparatus.

2. *BUDD* agrees to take all proper steps to ensure that its employees observe the terms of Article "E" 1 and further agrees that whenever it is proper to do so it will

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take legal action in a Court of competent jurisdiction to enforce any one or more of the legal or equitable remedies available to a trade secret plaintiff.

Budd told its employees the Cropper machine was confidential and required them to sign confidentiality agreements. Budd otherwise treated the Cropper machine like its other manufacturing equipment.

A former Budd employee said Budd made no effort to keep the secret. That Budd did not keep the machine hidden from employees legally bound to keep their knowledge confidential does not evidence a failure to maintain the secret. Similarly, that du Pont employees were shown the machine to see if they could help increase its speed does not itself establish a breach of the secrecy agreement. There is no evidence of when that viewing occurred. There is no evidence that a viewer of the machine could thereby learn anything of which process, among all possible processes, the machine is being used to practice. As Cropper testified, looking at the machine in operation does not reveal whether it is stretching, and if so, at what speed. Nor does looking disclose whether the crystallinity and temperature elements of the invention set forth in the claims are involved. There is no evidence that Budd's secret use of the Cropper machine made knowledge of the claimed process accessible to the public.

The district court held all claims of the '566 patent invalid under 102(b), *supra*, note 3, because "the invention" was "in public use [and] on sale" by Budd more than one year before Gore's application for patent. Beyond a failure to consider each of the claims independently, 35 U.S.C. §282; *Altoona Publix Theatres, Inc. v. American Tri-Ergon Corp.*, 294 U.S. 477, 487, 24 USPQ 308 (1935), and a failure of proof that the claimed inventions as a whole were practiced by Budd before the critical May 21, 1969 date, it was error to hold that Budd's activity with the Cropper machine, as above indicated, was a "public" use of the processes claimed in the '566 patent, that activity having been secret, not public.

Assuming, *arguendo*, that Budd sold tape produced on the Cropper machine before October 1969, and that that tape was made by a process set forth in a claim of the '566 patent, the issue under §102(b) is whether that sale would defeat Dr. Gore's right to a patent on the process inventions set forth in the claims.

[8] If Budd offered and sold anything, it was only tape, not whatever process was used in producing it. Neither party contends, and there was no evidence, that the public could learn the claimed process by examining the tape. If Budd and Cropper commercialized the tape, that could result in a forfeiture of a patent granted them for their process on an application filed by them more than a year later. *D.L. Auld Co. v. Chroma Graphics Corp.*, No. 83-585, slip op. at 5-6 (Fed. Cir. Aug. 15, 1983); See *Metalizing Engineering Co. v. Kenyon Bearing & Auto Parts Co.*, 153 F.2d 516, 68 USPQ 54 (2d Cir. 1946). There is no reason or statutory basis, however, on which Budd's and Cropper's secret commercialization of a process, if established, could be held a bar to the grant of a patent to Gore on that process.

[9]

[10] Early public disclosure is a linchpin of the patent system. As between a prior inventor who benefits from a process by selling its product but suppresses, conceals, or otherwise keeps the process from the public, and a later inventor who promptly files a patent application from which the public will gain a disclosure of the process, the law

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favors the latter. See *Horwath v. Lee*, 564 F.2d 948, 195 USPQ 701 (CCPA 1977). The district court therefore erred as a matter of law in applying the statute and in its determination that Budd's secret use of the Cropper machine and sale of tape rendered all process

Page 311

claims of the '566 patent invalid under §102(b).

**( iii) §103**

In considering claims 1, 3, 17, and 19 of the '566 patent, the district court recognized that analysis of the obviousness issue under §103 requires determination of the scope and content of the prior art, the differences between the prior art, and the claims at issue, and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966).

[11]

[12]

[13] In its consideration of the prior art, however, the district court erred in not taking into account the import of the markedly different behavior of PTFE from that of conventional thermoplastic polymers clearly established and undisputed on the record, and in thus disregarding the unpredictability and unique nature of the unsintered PTFE to which the claimed inventions relate, *In re Whiton*, 420 F.2d 1082, 164 USPQ 455 (CCPA 1970); in considering claims in less than their entireties, *Schenck*, supra; and in considering the references in less than their entireties, i.e., in disregarding disclosures in the references that diverge from and teach away from the invention at hand. *In re Kuderna*, 426 F.2d 385, 165 USPQ 575 (CCPA 1970).

Invalidity of claim 1 under §102(a) having been determined, it is unnecessary to discuss in detail the applicability of §103 to that claim. If claim 1 had not been held anticipated under §102(a) in light of operation of the 401 machine, it is clear from the discussion here that claim 1 could not properly have been held invalid under §103.

Claim 3 depends from and thus incorporates claim 1 but specifies a rate of stretch of 100% per second. Claim 17 also depends from claim 1 and specifies an amount of stretch of about twice the original length. Claim 19 depends from claim 17 but specifies an amount of stretch of about five times the original length.

U.S. patent 2,983,961 to Titterton, Volume 13 of the *Encyclopedia of Polymer Science and Technology* (1970), the Sumitomo patent, and witnesses for both parties, establish that teachings related to conventional thermoplastic polymers are inapplicable to PTFE.

Articles by Dogliotti and Yelland, *Effect of Strain Rate on the Viscoelastic Properties of High Polymeric Fibrous Materials*, 4 *High Speed Testing* 211 (1964) and Robinson and Graham, *Methods of Characterization of Polymeric Materials by High Speed Testing Techniques*, 5 *High Speed Testing* 261 (1965), teach that conventional plastics and sintered PTFE can be stretched further if stretched slowly. Dr. Gore demonstrated at trial and at oral argument before us that an attempt to stretch highly crystalline, unsintered PTFE slowly results in breakage, and that rapid stretching produces a greatly lengthened rod of soft, flexible material.

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The '566 patent contains an example of stretching an article to 16 times its length. Smith and the '915 patent teach that PTFE could not be stretched beyond four times its length without heating it to above its crystalline melt temperature, a step avoided by Dr. Gore and as set forth in the claims.

Sumitomo teaches that there is a length limit to stretching unsintered PTFE, and does not suggest what that limit might be. Markwood, U.S. patent 3,208,100 to Nash (Nash), and U.S. patent 2,823,421 to Scarlett (Scarlett) teach that *non-PTFE* thermoplastics can be stretched rapidly and to extended lengths, and *also* teach reduction, elimination, or avoidance of crystallinity before stretching.

The disclosure in the Smith and '915 patents that a PTFE article may be stretched to as much as four times its length encompasses the step of stretching to twice its length set forth in claim 17 and establishes that such step would have been obvious.

[14] Claims 3 and 19 must be considered individually and separately. 35 U.S.C. §282. Nowhere, in any of the references, is it taught or suggested that highly crystalline, unsintered PTFE could be stretched at a rate of about 100% per second as required by asserted claim 3. Nor is it anywhere suggested that by rapid stretching a PTFE article be stretched to more than five times its original length as required by asserted claim 19. On the contrary, the art as a whole teaches the other way.

[15] In concluding that obviousness was established by the teachings in various pairs of references, the district court lost sight of the principle that there must have been something present in those teachings to suggest to one skilled in the art that the claimed invention before the court would have been obvious. *In re Bergel*, 292 F.2d 955, 956-57, 130 USPQ 206, 208 (CCPA 1961); *In re Sponnoble*, 405 F.2d 578, 585, 160 USPQ 237, 244 (CCPA 1969).

The court's pairing of Sumitomo and Markwood disregarded, as above indicated, the undisputed evidence that the unsintered PTFE of Sumitomo does not respond to the conventional plastics processing of Markwood and the art recognition of that fact. *Whiton*, *supra*, 420 F.2d at 1085, 164 USPQ at 457.

In evaluating claim 19, for example, the pairing disregarded Sumitomo's limited

Page 312

length of stretch teaching. In evaluating claim 3, the court recognized that Sumitomo made no mention of rate of stretch. Looking to Markwood to supply that teaching disregarded not only the conventional plastics-unsintered PTFE distinction but also the clear divergence of Markwood's teaching that crystallinity must be reduced or avoided from the presence of "highly crystalline" in all claims of the '566 patent.

Similarly, and for many of the same reasons, the pairing of Markwood's and Smith's teachings was an inappropriate basis for concluding that the processes set forth in claims 3 and 19 would have been obvious. As above indicated, Markwood's rapid stretching of conventional plastic polypropylene with reduced crystallinity would not suggest rapid stretching of highly crystalline PTFE, in light of teachings in the art that PTFE should be stretched slowly. The Smith patent is owned by du Pont, where Dr. Gore's process invention was considered to have produced a "remarkable new material." That circumstance is not surprising, for Smith, though dealing with PTFE, says not a word

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about any rate of stretch.

Lastly, the pairing of Sumitomo and the '915 patent suffers from the same shortcomings. The pairing resulted from a hypothetical set forth in Garlock's post trial brief, and was based on no testimony or other evidence in the record. In respect to claim 3, neither reference mentions rate of stretch or suggests its importance. In respect of claim 19 both references point away from the claimed invention in their limited length-of-stretch teachings. The '915 patent states: "the 65 percent expanded material could be expanded a second time for an additional 65 percent expansion or a total length increase ratio of 1:2.72 [less than three times the original length]. However, great care was necessary to obtain a uniformly expanded material at these very great expansion ratios." Thus the '915 patent suggests that the amount of stretch of 500% set forth in claim 19 (more than five times the original length) is not possible.

As indicated, Sumitomo and Smith are totally silent respecting the rate of stretch, and there is simply no teaching in the art that would suggest to one of ordinary skill that Markwood's fast stretching of other thermoplastics could or should be employed in the process of treating PTFE taught by either Sumitomo or Smith. Indeed, Smith not only says nothing about rate of stretch, its preferred teaching is away from other elements of the inventions set forth in claims 3 and 19 Smith discloses that stretching should be done after the PTFE is heated above its crystalline melting point and with decreased crystallinity. Smith teaches:

Below about 300°C it is *not possible* to draw more than about 4X [times] and while such draw ratios can be attained around 300°C and below the polymer's crystalline melting point with resultant orientation and improved properties it is preferred to use temperatures at or above the polymer's crystalline melting point. (Emphasis added).

Nash teaches that the film should be plasticized, i.e., made more viscous, before stretching. Contrary to that teaching, Dr. Gore did not reduce crystallinity before increasing the rate of stretch, but maintained the unsintered PTFE "highly crystalline" while stretching at a 100% per second rate and to more than five times, as set forth respectively in claims 3 and 19.

[16] On the entire record and in view of all the references, each in its entirety, it is clear that a person of ordinary skill confronted with a PTFE tape breakage problem would have either slowed the rate of stretching or increased the temperature to decrease the crystallinity. Dr. Gore did neither. He proceeded contrary to the accepted wisdom of the prior art by dramatically increasing the rate and length of stretch *and* retaining crystallinity. That fact is strong evidence of nonobviousness. *United States v. Adams*, 383 U.S. 39 (1966).

Having learned the details of Dr. Gore's invention, the district court found it within the skill of the art to stretch other material rapidly (Markwood); to stretch PTFE to increase porosity (Sumitomo); and to stretch at high temperatures (Smith). The result is that the claims were used as a frame, and individual, naked parts of separate prior art references were employed as a mosaic to recreate a facsimile of the claimed invention. At no point did the district court, nor does Garlock, explain why that mosaic would have been obvious to one skilled in the art in 1969, or what there was in the prior art that would have caused those skilled in the art to disregard the teachings there found against

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making just such a mosaic. On the contrary, the references and the uncontested testimony, as above indicated, established that PTFE is *sui generis*. It is not surprising, therefore, that, unlike the situation in *Stratoflex, Inc. v. Aeroquip Corp.*, 218 USPQ 871 (Fed. Cir. 1983), there was no testimony and no finding that one skilled in the art would transfer conventional thermoplastic processes to those for unsintered PTFE, or would have been able to predict what would happen if they did.

[17] To imbue one of ordinary skill in the art with knowledge of the invention in suit,

Page 313

when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

[18] It is difficult but necessary that the decisionmaker forget what he or she has been taught at trial about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references, and who is normally guided by the then-accepted wisdom in the art. Had that been here done the inventions set forth in the claims 3 and 19 of the '566 patent could only have been held non-obvious to those skilled in the art at the time those claimed inventions were made.

[19] Error in visualizing the burden of proof on obviousness may have contributed to the court's application here of the prior art. Adopting the phrase from earlier precedents, the court said "the presumption [of validity] is weakened greatly where the Patent Office has failed to consider pertinent prior art." That is not the law of established precedent in this court. *SSIH Equipment S.A. v. ITC*, 218 USPQ 678, 687 (Fed. Cir. 1983); *Solder Removal Co. v. ITC*, 582 F.2d 628, 633, 199 USPQ 129, 133, n. 9 (CCPA 1978). The presumption has no separate evidentiary value. It cautions the decisionmaker against a rush to conclude invalidity. Submission of additional art that is merely "pertinent" does not dispel that caution. It is difficult to imagine a patent law suit in which an accused infringer is unable to add some new "pertinent" art. The inescapable burden of persuasion on one who would prove invalidity, however, remains throughout the trial. 35 U.S.C. §282.

[20] The burden of proving invalidity may of course be facilitated by prior art that is *more pertinent* than that considered by the PTO. That did not happen here. In the present case, Sumitomo, Smith, and the '915 patent were among references considered by the PTO. Other references referred to as not considered were merely cumulative, disclosing nothing not disclosed in references that were considered by the PTO. The Canadian counterpart of Nash was considered by the PTO. The relevant disclosures of Markwood appear in Sandiford patent 3,544,671 and Paratheon patent 3,637,906, both considered by the PTO. The Russian Author's Certificate 240,997, assuming its status as prior art and whatever the material with which it dealt, contributed nothing beyond the teachings of the '915 patent considered by the PTO.

[21] As discussed more fully below, the district court erred in specifically declining to consider the objective evidence of nonobviousness. In *re Sernaker*, 702 F.2d 989, 996, 217 USPQ 1, 7 (Fed. Cir. 1983). That evidence can often serve as insurance against the

insidious attraction of the siren hindsight when confronted with a difficult task of evaluating the prior art. Though the prior art evidence here pointed more in the direction of nonobviousness than obviousness, the objective evidence may tend, as it did in *Sernaker, supra*, to reassure the decisionmaker.

In sum, the district court erred as a matter of law on this record in concluding that Garlock had met its burden of proving that the inventions of claims 3 and 19 of the '566 patent would have been obvious.

**(b) ' 390 patent**  
**(i) §102**

The district court found product claims 1, 9, 12, 14, 18 and 43 inherently anticipated because it found that the microstructure of nodes interconnected by fibrils is an inherent characteristic of paste-extruded PTFE products resulting from the process disclosed in Smith. The court found the first four of those claims and claim 43, plus claims 35, 36, 67 and 77 inherently anticipated because high strength PTFE products are inherent in the examples of Sumitomo.

The teachings of Smith include neither a disclosure nor a suggestion of "porous" products having a "microstructure characterized by nodes interconnected by fibrils" as required by the claims found to have been anticipated by Smith.

The teachings of Sumitomo do not include a disclosure of products having "a matrix tensile strength \* \* \* above about 7,300 psi" as required by the claims found to have been anticipated by Sumitomo.

[22] Anticipation requires the disclosure in a single prior art reference of each element of the claim under consideration. *Soundscriber Corp. v. U.S.*, 360 F.2d 954, 960, 148 USPQ 298, 301, adopted, 149 USPQ 640 (Ct. Cl. 1966). Neither Smith nor Sumitomo disclose an invention set forth in any claim of the '390 patent.

The incongruity in findings that the different processes of Smith and Sumitomo each inherently produced identical products is striking.

Garlock attempted with expert testimony to overcome the prior art shortcomings as proof of anticipation. Gore rebutted with its own expert testimony. It is unnecessary, however, to resolve apparent conflicts in the divergent testimony, much if not all of which took

Page 314

the form of pure unsupported assertion. No inter partes tests in which the Smith and Sumitomo processes were conducted are of record. No products of those processes were placed in evidence, and there was, of course, no analysis of any such evidentiary products.

Nor is it necessary to evaluate the inappropriate disparagement in Garlock's brief of Dr. Sperati as a "friend" of Gore.

[23] Given the unique nature of unsintered PTFE, we are not persuaded that the "effect" of the processes disclosed in Smith and Sumitomo, an "effect" undisclosed in those patents, would be always to inherently produce or be seen always to produce products meeting all of the claim limitations. Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of

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products that might result from the practice of processes disclosed in references. In *re Felton*, 484 F.2d 495, 500, 179 USPQ 295, 298 (CCPA 1973). It is clear that the teachings of neither Smith nor Sumitomo place the products claimed in the '390 patent in possession of the public.

The teachings of Smith and Sumitomo are so unacceptably vague concerning characteristics of products produced by their respective processes as not to support an anticipation rejection. That fact is confirmed by the PTO's having fully considered those references and by its having issued the '390 patent over them.

[24] Garlock's assertion that it employs a process covered by the Smith patent, if true, is irrelevant. The '390 patent was allowed over Smith as a reference. Assuming Smith is a dominating patent, the rule of law is clear that an accused infringer's employment of the process of a dominating patent does not render that employment an anticipation of an invention described and claimed in an improvement patent. As indicated, there is no present record basis for finding that the Smith process in itself necessarily and inherently results in the products, each considered in its entirety, in the claims of the '390 patent. The testimony of Garlock's expert about *ex parte* tests, the records of which he destroyed before trial, cannot serve as such a basis. The effusive praise of Dr. Gore's claimed products by the owner of the Smith patented process would appear, on the contrary, to confirm the action of the PTO in issuing the '390 patent.

Garlock has not met its burden of showing that claims 1, 9, 12, 14, 18, and 43 are anticipated by Smith or that claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 are anticipated by Sumitomo.

## (ii) §103

[25] The scope and content of the prior art and level of ordinary skill, discussed above in relation to the '566 patent, would be the same for the '390 patent. The district court did not, however, nor does Garlock, apply the Graham criteria, *supra*, to the '390 claims, apparently assuming that the claimed products, having been found inherent in the processes of Sumitomo and Smith, would have been obvious in view of those references. If so, that was error. Inherency and obviousness are distinct concepts. In *re Spormann*, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966).

In discussing inherency the district court did recognize differences between Smith's disclosure and the inventions set forth in claims 1, 9, 12, 14, 18, and 43, i.e., the absence from Smith of a description of the products of Smith's process as porous and the absence from Smith of a disclosure that those products have a microstructure characterized by nodes interconnected by fibrils.

Similarly, a difference between Sumitomo's disclosure and the inventions set forth in claims 1, 9, 12, 14, 35, 36, 43, 67, and 77 was recognized in the absence from Sumitomo of a quantification of the matrix tensile strengths of the products of Sumitomo's process. The district court also discussed differences between the dependent claims and the prior art. Because we conclude that the independent claims of the '390 patent are patentable over the art of record, we need not discuss the dependent claims.

[26] Having determined that the invention would have been obvious in view of the process of either Smith or Sumitomo, the district court did not discuss the strong showing of objective evidence of nonobviousness here present, saying with respect to one part of such evidence, "no amount of commercial success can save it." That approach was error.

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All evidence bearing on the issue of obviousness, as with any other issue raised in the conduct of the judicial process, must be considered and evaluated *before* the required legal conclusion is reached. *Stratoflex*, supra, 218 USPQ at 879.

[27] The objective evidence of nonobviousness, i.e., the "indicia" of *Graham*, supra, may in a given case be entitled to more weight or less, depending on its nature and its relationship to the merits of the invention. It may be the most pertinent, probative, and revealing evidence available to aid in reaching a conclusion on the obvious/nonobvious issue. It should when present always be considered as an integral part of the analysis.

Gore's fabric laminates, for example, as set forth in claims 36 and 77, satisfied a long-felt

Page 315

need for a material having the contradictory properties of being simultaneously breathable (allowing water vapor or perspiration to pass) and waterproof. The record establishes that such a material had long been sought by makers of rainwear and outerwear, and by the U.S. Army as well. That Gore's fabric laminates filled that need is attested by the rise in their annual dollar sales from zero to seven million in the first five years of their availability.

Gore's PTFE tubes for replacement of human arteries and veins, also satisfied a long-felt need. The uncontradicted evidence establishes that Gore's PTFE tubes hold blood without leaking, need not be pre-clotted with the patient's blood, are chemically inert, and, being breathable, are less likely to cause an air embolism. The value and uniqueness of those four properties make Gore's PTFE tubes, as described in unchallenged testimony, "the most important synthetic material presently existing" in vascular surgery, and, along with other evidence in the record, reflect the intended working of the patent system.

As discussed above, current annual sales of over sixty million dollars are attributable to the merits of the products claimed in the '390 patent. Considering the long-felt need for those products and the obvious commercial advantage to be gained by meeting that need, it is reasonable to conclude that the claimed products of the '390 patent would not have been obvious to persons of ordinary skill in the art at the time the claimed inventions were made.

[28] As above indicated, the praise which greeted the products claimed in the '390 patent from PTFE suppliers, including the owner of the Smith patent, is further objective evidence of nonobviousness.

[29] Garlock's appeal argument that the '390 claims are invalid because the recited minimum matrix tensile strengths are not "critical" is without merit. A claim to a new product is not legally required to include critical limitations. *In re Miller*, 441 F.2d 689, 696, 169 USPQ 597, 602 (CCPA 1971). The '390 claims are not drawn to optimization of ingredients or ranges within broad prior art teachings, but to new porous PTFE products of particular characteristics.

In sum, and in view of the difficulty of working with unsintered PTFE and its unpredictable response to various processing techniques, the vagueness of Smith and Sumitomo concerning the products produced by those processes, the filling of at least two

long-felt needs and the commercial success described above, we conclude that the inventions set forth in claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent would not have been obvious to those skilled in the art at the time those inventions were made.

**( c ) §112 and the '566 and '390 patents**

The patents in suit resulted from a single application and thus have substantially identical specifications. The holding of invalidity on the basis of §112 is common to both patents.

The district court found that the patents did not disclose sufficient information to enable a person of ordinary skill in the art to make and use the invention, as required by §112, first paragraph, and that certain claim language was indefinite, presumably in light of §112, second paragraph, because: (1) there was no definition in the specification of "stretch rate," different formulae for computing stretch rate having been developed and presented at trial; (2) there was no way taught in the specification to calculate the minimum rate of stretch above 35°C; (3) the phrase "matrix tensile strength" is indefinite; and (4) the phrase "specific gravity of the solid polymer" is indefinite.

[30] The findings rest on a misinterpretation of §112, its function and purpose. The district court considered whether certain terms would have been enabling to the public and looked to formula developments and publications occurring well after Dr. Gore's filing date in reaching its conclusions under §112. Patents, however, are written to enable those skilled in the art to practice the invention, not the public. In *re Storrs*, 245 F.2d 474, 478, 114 USPQ 293, 296-97 (CCPA 1957), and §112 speaks as of the application filing date, not as of the time of trial. In *re Mott*, 539 F.2d 1291, 1296, 190 USPQ 536, 541 (CCPA 1976). There was no evidence and no finding that those skilled in the art would have found the specification non-enabling or the claim language indefinite on May 21, 1970, when the application which resulted in issuance of Dr. Gore's patents was filed. Indeed, the expert quoted by the district court and whose testimony was primarily relied upon respecting formulae, was still in school at that time.

There is uncontradicted evidence in the record that at the time the application was filed "stretch rate" meant to those skilled in the art the percent of stretch divided by the time of stretching, and that the latter was measurable, for example, with a stopwatch. Concern for the absence from the specification of a formula for calculating stretch rate is therefore misplaced, and the post-filing date development of varying formulae, including Dr. Gore's later addition of a formula in his corresponding Japanese patent, is irrelevant.

Page 316

[31] Section 112 requires that the inventor set forth the best mode of practicing the invention known to him at the time the application was filed. Calculating stretch rate at that time was accomplished by actually measuring the time required to stretch the PTFE material. That was the only mode then used by the inventor, and it worked. The record establishes that calculation by that mode would have been employed by those of ordinary skill in the art at the time the application was filed. As indicated, Dr. Gore's disclosure must be examined for §112 compliance in light of knowledge extant in the art on his

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application filing date.

[32] The district court, though discussing enablement, spoke also of indefiniteness of "stretch rate," a matter having to do with §112, second paragraph, and relevant in assessment of infringement. The use of "stretching \* \* \* at a rate exceeding about 10% per second" in the claims is not indefinite. Infringement is clearly assessable through use of a stopwatch. No witness said that could not be done. As above indicated, subsequently developed and therefore irrelevant formulae cannot be used to render non-enabling or indefinite that which was enabling and definite at the time the application was filed.

[33] Similarly, absence from the specification of a method for calculating the minimum rate of stretch above 35°C does not render the specification non-enabling. The specification discloses that "[t]he lower limit of expansion rates interact with temperature in a roughly logarithmic fashion, being much higher at higher temperatures." Calculation of minimum stretch rate above 35°C is nowhere in the claims, and it is the *claimed* invention for which enablement is required. The claims require stretching at a rate greater than 10% per second at temperatures between 35°C and the crystalline melt point of unsintered PTFE. That the minimum rate of stretch may increase with temperature does not render non-enabling Dr. Gore's specification, particularly in the absence of convincing evidence that those skilled in the art would have found it non-enabling at the time the application was filed.

[34] The district court invalidated both patents for indefiniteness because of its view that some "trial and error" would be needed to determine the "lower limits" of stretch rate above 10% per second at various temperatures above 35°C. That was error. Assuming some experimentation were needed, a patent is not invalid because of a need for experimentation. *Minerals Separation, Ltd. v. Hyde*, 242 U.S. 261, 270-71 (1916). A patent is invalid only when those skilled in the art are required to engage in *undue* experimentation to practice the invention. *In re Angstadt*, 537 F.2d 498, 503-04, 190 USPQ 214, 218 (CCPA 1976). There was no evidence and the court made no finding that undue experimentation was required.

[35] Moreover, the finding here rested on confusion of the role of the specification with that of the claims. The court found that the specification's failure to state the lower limit of stretch rate (albeit above 10% per second) at each degree of temperature above 35°C (a requirement for at least hundreds of entries in the specification) did not "distinguish processes performed above the 'lower limit' from those performed below the 'lower limit'." The claims of the '390 patent say nothing of processes and lower limits. Distinguishing what infringes from what doesn't is the role of the claims, not of the specification. It is clear that the specification is enabling, *In re Storrs*, *supra*, and that the claims of both patents are precise within the requirements of the law. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971).

[36] The finding that "matrix tensile strength" is indefinite, like the other findings under §112, appears to rest on a confusion concerning the roles of the claims and the specification. While finding "matrix tensile strength" in the claims indefinite, the district court at the same time recognized that the specification itself disclosed how to compute matrix tensile strength, in stating "to compute matrix tensile strength of a porous specimen, one divides the maximum force required to break the sample by the cross

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sectional area of the porous sample, and then multiplies this quantity by the ratio of the specific gravity of the solid polymer divided by the specific gravity of the porous specimen." Further, the specification provided the actual matrix tensile strength in several examples. It is well settled that a patent applicant may be his own lexicographer. In light of the disclosure of its calculation in the specification, we cannot agree that "matrix tensile strength" is either indefinite or non-enabling.

Nor does absence from the specification of a definition for "specific gravity of the solid polymer," a part of the computation of matrix tensile strength, render that computation indefinite. It is undisputed that in the many examples in the application the specific gravity values used for unsintered and sintered PTFE were 2.3 and 2.2, respectively. There was no testimony that those values were not known to persons of ordinary skill in the art or could not be calculated or measured. There is simply no support for the conclusion that "specific gravity of the solid polymer" is indefinite or that absence of its definition ren

Page 317

ders the specification non-enabling. See *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

We conclude that Garlock has failed to prove that at the time the application was filed, the specification was not enabling or that the claims were indefinite within the meaning of §112.

## ( 2) Fraud

[37] Fraud must be shown by clear and convincing evidence. *Norton v. Curtiss*, 433 F.2d 779, 797, 167 USPQ 532, 546-47 (CCPA 1970).

The state of mind of the one making the representations is probably the most important of the elements to be considered in determining the existence of "fraud." \* \* \* Good faith and subjective intent, while they are to be considered, should not *necessarily* be made controlling. Under ordinary circumstances, the *fact* of misrepresentation coupled with proof that the party making it had knowledge of its falsity is enough to warrant drawing the inference that there was a fraudulent intent. Where public policy demands a complete and accurate disclosure it may suffice to show nothing more than that the misrepresentations were made in an atmosphere of gross negligence as to their truth. [emphasis in original].

*Norton*, 433 F.2d at 795-96; 167 USPQ at 545; see, *Miller*, *Fraud on the PTO*, 58 JPOS 271 (1976).

Garlock alleges fraud in Gore's representations that stretching PTFE tape at a rate greater than 10% per second was novel and that it produces a physical phenomenon. The district court found the evidence insufficient to establish that Gore had a specific intent to defraud the PTO. No basis exists for our overturning that finding. Accordingly, we agree with the district court that Garlock has failed to sustain its heavy burden of proving, by clear and convincing evidence, sufficient facts from which fraudulent intent can be inferred.

Garlock points to a September 4, 1975, Gore affidavit filed in the PTO that stated:

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2. Prior to my invention disclosed in the captioned patent application, during production of expanded PTFE products by W. L. Gore & Associates, Inc., the rate of stretching was neither measured nor controlled and to my knowledge did *not* involve stretching of unsintered PTFE at a rate exceeding about 10% per second. (emphasis in original)

No finding of the district court and no evidence of record establishes that that statement was made in reckless disregard of facts from which an intent to defraud may be inferred.

The district court's finding in 1982 that the 401 machine inherently stretched tape at some time in 1969 at a rate more than 10% per second, does not establish that Dr. Gore was aware of that fact in 1975, nor does it make untrue his statement that to his knowledge that had not been the rate of stretch employed. Nor does the district court's finding conflict with Dr. Gore's statement that the rate of stretching was neither measured nor controlled in the Gore shop before his invention of the claimed process as a whole.

Nor does the evidence of isolated statements support Garlock's contention that Dr. Gore attempted to convince the PTO that a physical phenomenon always existed in which stretching at a rate greater than 10% per second always produced a matrix tensile strength greater than 7300 psi. On the contrary, Dr. Gore set forth in his specification examples indicating that some samples broke, ruptured, or disintegrated.

### **(3) Attorney's Fees**

The district court did not abuse its discretion in denying Garlock its request for attorney fees.

### ***Infringement***

[38] Where, as here, an appellate court reverses a holding of invalidity, and remand is ordered for trial of the factual issue of infringement, an inefficient use of judicial resources results if the second judgment is appealed. The better practice would therefore be for the district court to decide both the validity and infringement issues when both are contested at the trial, enabling the conduct of a single appeal and disposition of the entire case in a single appellate opinion.

Resolution of the infringement issue at trial may also overlap with resolution of the validity issue, where, for example, the claimed invention was or was not copied by the validity challenger, or the challenger substituted the claimed invention for freely available prior art processes or products, *Eibel*, supra, 261 U.S. at 56, or an assertion of nonenablement may conflict with the ease with which the accused infringer may be shown to have practiced the invention as taught in the patent. *Eibel Process Co. v. Minnesota & Ontario Paper Co.*, 261 U.S. 45, 61 (1923).

[39] The district court having declined to decide the infringement issue, Gore suggests that the record here is sufficient to warrant

our deciding it now. With reluctance in view of the length and bitter nature of the present litigation, we decline the suggestion. In so doing, we imply nothing of our view on the issue. Nor do we intend any implication that the district court could not itself determine the infringement issue on the present record. Infringement of particular claims of two

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patents was asserted. None of those claims has been finally held invalid. Assuming their continued assertion, infringement must be decided with respect to each asserted claim as a separate entity. *Altoona, supra*, 294 U.S. at 487. Those factual determinations should be made in the first instance by the district court.

### ***Decision***

The holdings of invalidity of claim 1 of the '566 patent under §102(a) and of claim 17 of the '566 patent under §103, the determination that Gore did not commit fraud on the PTO, and the denial of attorney fees, are affirmed; the holdings that all claims of the '566 patent are invalid under §102(b), that claims 3 and 19 of the '566 patent are invalid under §103, and that all claims of the '566 patent are invalid under §112, are reversed. The holdings that claims 1, 9, 12, 14, 18, 35, 36, 43, 67, and 77 of the '390 patent are invalid under §§102 and 103, and that all claims of the '390 patent are invalid under §112, are reversed. The case is remanded for determination of the infringement issue.

*Affirmed in part, reversed in part, and remanded.*

### **Appendix**

#### ***Appendix***

Claims of the '566 patent discussed at trial:

1. A process for the production of a porous article of manufacture of a polymer of tetrafluoroethylene which process comprises expanding a shaped article consisting essentially of highly crystalline poly (tetrafluoroethylene) made by a paste-forming extrusion technique, after removal of lubricant, by stretching said unsintered shaped article at a rate exceeding about 10% per second and maintaining said shaped article at a temperature between about 35°C. and the crystalline melt point of said tetrafluoroethylene polymer during said stretching.

3. The process of claim 1 in which the rate of stretch is about 100% per second.

17. The process of claim 1 in which the shaped article is expanded such that its final length in the direction of expansion is greater than about twice the original length.

19. The process of claim 17 in which said final length is greater than about five times the original length.

Claims of '390 patent discussed at trial:

1. A porous material consisting essentially of highly crystalline polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 73,000 psi.

9. A porous material consisting essentially of polytetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above 9290 psi, which material has been heated to a temperature above the crystalline melt point of said polymer and has a crystallinity below about 95%.

12. A porous material in accordance with claim 9 which is in the form of a shaped article.

14. A product in accordance with claim 12 which is in the form of a film.

18. A product in accordance with claim 12 which is in the form of continuous filaments.

35. A laminated structure comprising (a) a first shaped article formed of a porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils and has a matrix tensile strength in at least one direction above about 7,300 psi, and (b) a second shaped article bonded to said first shaped article.

36. The structure of claim 35 in which said first shaped article is formed of a porous material which has a matrix tensile strength in at least one direction of at least 9290 psi, and has a crystallinity below about 95%.

43. A porous material made of a tetrafluoroethylene polymer, which material has a microstructure characterized by nodes interconnected by fibrils, which material (a) has a matrix tensile strength in at least one direction above about 9290 psi, (b) has been heated to a temperature above 327° C. and has a crystallinity below about 95%, and (c) has a dielectric constant of 1.2-1.8.

67. An impregnated structure comprising  
(a) a shaped article formed of a porous material made of a tetrafluoroethylene polymer which material has a microstructure characterized by nodes interconnected by fibrils and a matrix tensile strength in at least one direction above about 9290 psi, and

Page 319

(b) a polymer impregnated within the pores of the said shaped article.

77. The structure of claim 35 in which the first shaped article is a sheet having pores that will pass a gas but will not pass liquid water.

### Footnotes

Footnote 1. 35 U.S.C. §102(a) and (b) provide:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or \* \* \*

35 U.S.C. §103 provides:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter

pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. §112 provides:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

### **Concurring/Dissenting Opinion Text**

#### **Concurrence/Dissent By:**

**Davis, Circuit Judge, concurring in the result in part and dissenting in part.**

I concur in the result on (1) the validity of the '390 patent under §§ 102-103; (2) the validity of the '390 patent under §112; (3) the invalidity of claims 1 and 17 of the '566 patent; (4) lack of fraud on the Patent and Trademark Office; and (5) denial of attorneys' fees. I disagree and dissent as to the validity of claims 3 and 19 of the '566 patent.

1. The process invention embodied in claim 1 of the '566 patent was known, through use of the 401 machine in the Gore shop, well before the "invention date" (claimed by Robert Gore, the inventor) of October 1969. <sup>1</sup> As such, the claimed invention was invalid on at least three grounds: (i) it was anticipated and therefore would have been obvious (under 35 U.S.C. §103) at the time of the claimed invention date; (ii) the invention was "in public use" by the Gore shop (under 35 U.S.C. §102(b)) more than one year prior to the patent application (i.e., prior to May 21, 1969); and (iii) the invention (made by Robert Gore) was known to and used "by others in this country" (35 U.S.C. §102(a)) before the claimed invention date of October 1969, i.e. the invention was used by Wilbert Gore and others in the Gore shop before the October date. <sup>2</sup>

The critically important aspect of the invention of the '566 patent is the stretching of PTFE at a rate above 10% per second. <sup>3</sup> Robert Gore testified that he conceived this invention no earlier than October 1969 (and we have the right to take him at his word), <sup>4</sup> but the facts found by the District Court plainly show that the Gore shop was in fact practicing that invention considerably earlier.

The District Court found that in the 401 machine the distance between the stretch rollers controls the rate of stretch; a shorter distance results in a higher rate of stretch; for the process described in the '915 patent to be practiced with a rate of stretch *below* 10% per second, the distance between the stretch rollers would have to be greater than five feet; if the distance is less than four feet, the rate of stretch is greater than 10% per second; the machine drawings used to construct the 401 machine indicate that the distance between the stretch rollers was eight *inches* ; a Gore employee testified that "I

am reasonably sure that no effective [stretch] rolls in question would have been more than three feet simply because of the nature and size of the equipment" and that he did not remember any stretching more than three feet; another Gore employee testified that the distance between the rollers was "a maximum of 18 *inches*" (emphasis added); a document prepared by the same employee (an engineer) on June 10, 1969 reports that the stretch span was 8 *inches*; the 401 machine was the only stretching machine used by the Gore company; and the 401 machine was never substantially changed before October 1969. All this adds up to the fact that the 401 machine was at all relevant times operated with a stretch of less than four feet.<sup>5</sup> There is no question that the machine was so operated before October 1969 (the District Court found that sales of tape made by the 401 machine were proposed in August 1969).

I can accept Robert Gore's affidavit (to the PTO) that there was no stretching in the Gore shop at a rate exceeding about 10% per second prior to "my invention disclosed in the captioned patent application" (emphasis added)<sup>6</sup> only because that declaration was expressly qualified by the phrase "to my knowledge" (emphasis added). The District Court specifically found no specific intent by Robert Gore to defraud and, on this record, we

Page 320

cannot properly overturn that finding. But the absence of personal intent to defraud does not mean or say that, whether Robert Gore realized it or not, the 401 machine was not actually operating, well before October 1969, to stretch unsintered PTFE at a rate exceeding about 10% per second. Cf. *O'Brien v. Westinghouse Electric Corp.*, 293 F.2d 1, 10 (3rd Cir. 1961). It seems impossible to me to reconcile Robert Gore's insistence on two facts--that (i) he invented the process in October 1969 and (ii) he had no knowledge prior to October 1969 of stretching PTFE at the critical rate--with the solid facts in the record as to the prior operation of the 401 machine, except on the view that Robert Gore did not realize that he and others in the Gore shop had made his invention previously.

2. It follows that in October 1969 the invention of '566 would have been obvious under §103 to Robert Gore because the prior practice of the 401 machine constituted prior art. Even if this was not prior art technically within §102, that statutory provision "is not the *only* source of prior art." In re Fout, 675 F.2d 297, 300 (CCPA 1982, emphasis in original). The 401 machine was practiced under the '915 patent (issued to Wilbert Gore) and, whether or not Robert Gore subjectively realized what was happening, he and others in the Gore shop were practicing the invention later embodied in the '566 patent. That was prior art at least as to Robert Gore. *Id.* at 300-01.<sup>7</sup>

3. If it be thought necessary to invoke §102 directly, in order to show anticipation, the record contains proof that the 401 machine was designed, constructed and used (just as described supra) in November and December 1968 and the early months of 1969--more than one year prior to the '566 patent application of May 21, 1970. See *Jt. App. E 1199-E 1200*. Section 102(b) therefore applies. Although commercial production was apparently not actively sought until June 1969, the practicing of the 401 machine prior to May 21, 1969 was "a public use" because the Gore company made "use of the device \* \* \* in the factory in the regular course of business." *Connecticut Valley Enterprises, Inc. v. United*

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States, 348 F.2d 949, 952, 146 USPQ 404, 406 (Cl. Cl. 1965).

4. Also, §102(a)<sup>8</sup> applies here because Robert Gore was the inventor in the '566 patent and Wilbert Gore and others in the Gore shop were using the 401 machine before October 1969. Wilbert Gore (the inventor in the '915 patent under which the 401 machine was made and used) and the other employees are "others" within §102(a)--they are not the same as Robert Gore who claimed to be inventor of the process that ripened into the '566 patent.<sup>9</sup> See also §102(f), which would bar Robert Gore if he did not himself invent the subject matter of the '566 patent.<sup>10</sup>

5. The majority sustains the validity of claims 3 and 19 of the '566 patent (the claims also involved in appellant's suit for infringement) which are dependent on invalid claim 1. Because of the invalidity of claim 1 the only possible novelty in claim 3 would be the requirement that the rate of stretch would be about 100% per second, and the possible novelty of claim 19 would be that the final length would be greater than about five times the original length. My position is that both of these added elements, if novel, would have been obvious to persons of ordinary skill in the art.

The defect in the majority's analysis is that it neglects the cardinal fact that the prior art included the 401 machine (discussed supra), not merely the earlier patents assessed in the majority opinion. The 401 machine directly involved PTFE itself, not conventional thermoplastic polymers. That machine also directly involved rapid stretching of PTFE at a rate markedly exceeding 10%. With this prior art of the 401 machine before him, an ordinary person skilled in the art would maximize stretch rate, if only to improve the machine's production rate. Cf. *In re Dwyer, Jewell, Johnson, McGrath, & Rubin*, 317 F.2d 203, 207, 137 USPQ 540 (CCPA 1963). Moreover, the very existence and operation of the 401 machine, which stretched PTFE rapidly without breaking, suggests to the skilled person the probability of stretching at even higher rates. Certainly, in the light of the 401 machine, skilled workers would see in at least

Page 321

the prior Markwood, Nash, and Scarlett patents (teaching extensive and rapid stretching of non-PTFE thermoplastics) the suggestion that the method of the 401 machine could also be used for comparable rapid and extensive stretching of PTFE.

6. In sum, I cannot escape the conclusion that--although there was no fraud proved--if the true facts as to the 401 machine had been made known to the PTO (as it requested), the involved claims of the '566 patent should (and probably would) not have been accepted.

### Footnotes

Footnote 1. The 401 machine was used under the prior '915 patent (issued to Wilbert Gore) which contains no reference to the significance of the rate of stretch.

Footnote 2. Aside from the bases I discuss, I do not reach the other grounds asserted for invalidity of the '566 patent.

Footnote 3. Before the PTO Robert Gore concededly referred to this as "critical" to his invention or as *his* "invention."

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Footnote 4. The District Court found that October 1969 was the earliest date Robert Gore asserts for his conception of the invention in the '566 patent.

Footnote 5. The Gores (Robert and Wilbert) testified at trial that the distance was five feet but there is no indication that the trial court (which did not cite this testimony but did cite the opposing evidence) credited the Gores' testimony.

Footnote 6. The factor of the rate of stretching was of direct interest to the examiner during the prosecution of the '566 patent. In response to the examiner's express request for a declaration that the Gore firm's production of stretched PTFE tape, prior to Robert Gore's invention asserted here, did not involve stretching of unsintered PTFE at a rate exceeding about 10% per second, Robert Gore filed an affidavit in the PTO specifically stating that "*to my knowledge*" (emphasis added) the 401 machine did *not* involve stretching at a rate exceeding about 10% per second.

Footnote 7. The District Court has found that there are no differences between claim 1 of the '566 patent and the processes previously used by the Gore firm to produce paste-extruded unsintered PTFE.

Footnote 8. An invention is anticipated if it "was known or used *by others* in this country \* \* \* before the invention thereof by the applicant for patent" (emphasis added).

Footnote 9. It is undisputed that it was Wilbert Gore who initiated the project for the 401 machine and watched over it.

Footnote 10. The majority's discussion of "secondary considerations," though it is relevant to other aspects of this case, is irrelevant to the issue of anticipation raised by the 401 machine, and hardly persuasive as to the issues of obviousness based on or with respect to the 401 machine.

- End of Case -





1985) (A reference in the clutch art was held reasonably pertinent to the friction problem faced by applicant, whose claims were directed to a braking material, because brakes and clutches utilize interfacing materials to accomplish their respective purposes.).

### ANALOGY IN THE ELECTRICAL ARTS

See, for example, *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993) (Patent claims were directed to single in-line memory modules (SIMMs) for installation on a printed circuit motherboard for use in personal computers. Reference to a SIMM for an industrial controller was not necessarily in the same field of endeavor as the claimed subject matter merely because it related to memories. Reference was found to be in a different field of endeavor because it involved memory circuits in which modules of varying sizes may be added or replaced, whereas the claimed invention involved compact modular memories. Furthermore, since memory modules of the claims at issue were intended for personal computers and used dynamic random-access-memories, whereas reference SIMM was developed for use in large industrial machine controllers and only taught the use of static random-access-memories or read-only-memories, the finding that the reference was nonanalogous was supported by substantial evidence.); *Medtronic, Inc. v. Cardiac Pacemakers*, 721 F.2d 1563, 220 USPQ 97 (Fed. Cir. 1983) (Patent claims were drawn to a cardiac pacemaker which comprised, among other components, a runaway inhibitor means for preventing a pacemaker malfunction from causing pulses to be applied at too high a frequency rate. Two references disclosed circuits used in high power, high frequency devices which inhibited the runaway of pulses from a pulse source. The court held that one of ordinary skill in the pacemaker designer art faced with a rate-limiting problem would look to the solutions of others faced with rate limiting problems, and therefore the references were in an analogous art.).

### EXAMPLES OF ANALOGY IN THE DESIGN ARTS

See MPEP § 1504.03 for a discussion of the relevant case law setting forth the general requirements for analogous art in design applications.

For examples of analogy in the design arts, see *In re Rosen*, 673 F.2d 388, 213 USPQ 347 (CCPA 1982) (The design at issue was a coffee table of contemporary styling. The court held designs of contemporary furniture other than coffee tables, such as the desk and circular glass table top designs of the references relied upon, would reasonably fall within the scope of the knowledge of the designer of ordinary skill.); *Ex parte Pappas*, 23 USPQ2d 1636 (Bd. Pat. App. & Inter. 1992) (At issue was an ornamental design for a feed bunk with an inclined corner configuration. Examiner relied upon references to a bunk lacking the inclined corners claimed by appellant and the *Architectural Precast Concrete Drafting Handbook*. The Board found the *Architectural Precast Concrete Drafting Handbook* was analogous art, noting that a bunk may be a wood or concrete trough, and that both references relied upon “disclose structures in which at least one upstanding leg is generally perpendicular to a base portion to define a corner configuration between the leg and base portion.”); *In re Butera*, 1 F.3d 1252, 28 USPQ2d 1399 (Fed. Cir. 1993) (unpublished - not citable as precedent) (The claimed invention, a spherical design for a combined insect repellant and air freshener, was rejected by the Board as obvious over a single reference to a design for a metal ball anode. The court reversed, holding the reference design to be nonanalogous art. “A prior design is of the type claimed if it has the same general use as that claimed in the design patent application . . . . One designing a combined insect repellant and air freshener would therefore not have reason to know of or look to a design for a metal ball anode.” 28 USPQ2d at 1400.).

### 2141.02 Differences Between Prior Art and Claimed Invention

Ascertaining the differences between the prior art and the claims at issue requires interpreting the claim language, and considering both the invention and the prior art references as a whole. See MPEP § 2111 - § 2116.01 for case law pertaining to claim interpretation.

### THE CLAIMED INVENTION AS A WHOLE MUST BE CONSIDERED

In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is

not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) (Claims were directed to a vibratory testing machine (a hard-bearing wheel balancer) comprising a holding structure, a base structure, and a supporting means which form “a single integral and gaplessly continuous piece.” *Nortron* argued the invention is just making integral what had been made in four bolted pieces, improperly limiting the focus to a structural difference from the prior art and failing to consider the invention as a whole. The prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” 713 F.2d at 785, 218 USPQ at 700 (citations omitted).).

See also *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) (Claims were directed to a three step process for preparing sweetened foods and drinks. The first two steps were directed to a process of producing high purity maltose (the sweetener), and the third was directed to adding the maltose to foods and drinks. The parties agreed that the first two steps were unobvious but formed a known product and the third step was obvious. The Solicitor argued the preamble was directed to a process for preparing foods and drinks sweetened mildly and thus the specific method of making the high purity maltose (the first two steps in the claimed process) should not be given weight, analogizing with product-by-process claims. The court held “due to the admitted unobviousness of the first two steps of the claimed combination of steps, the subject matter as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.” 535 F.2d at 69, 190 USPQ at 17 (emphasis in original). The preamble only recited the purpose of the process and did not limit the body of the claim. Therefore, the claimed process was a three step process, not the product formed by two steps of the process or the third step of using that product.).

## **DISTILLING THE INVENTION DOWN TO A “GIST” OR “THRUST” OF AN INVENTION DISREGARDS “AS A WHOLE” REQUIREMENT**

Distilling an invention down to the “gist” or “thrust” of an invention disregards the requirement of analyzing the subject matter “as a whole.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (restricting consideration of the claims to a 10% per second rate of stretching of unsintered PTFE and disregarding other limitations resulted in treating claims as though they read differently than allowed); *Bausch & Lomb v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 447-49, 230 USPQ 416, 419-20 (Fed. Cir. 1986), *cert. denied*, 484 U.S. 823 (1987) (District court focused on the “concept of forming ridgeless depressions having smooth rounded edges using a laser beam to vaporize the material,” but “disregarded express limitations that the product be an ophthalmic lens formed of a transparent cross-linked polymer and that the laser marks be surrounded by a smooth surface of unsublimated polymer.”). See also *Jones v. Hardy*, 727 F.2d 1524, 1530, 220 USPQ 1021, 1026 (Fed. Cir. 1984) (“treating the advantage as the invention disregards statutory requirement that the invention be viewed ‘as a whole’ ”); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1 USPQ2d 1593 (Fed. Cir.), *cert. denied*, 481 U.S. 1052 (1987) (district court improperly distilled claims down to a one word solution to a problem).

## **DISCOVERING SOURCE/CAUSE OF A PROBLEM IS PART OF “AS A WHOLE” INQUIRY**

“[A] patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This is part of the ‘subject matter as a whole’ which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103.” *In re Spinnoble*, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969). However, “discovery of the cause of a problem . . . does not always result in a patentable invention. . . . [A] different situation exists where the solution is obvious from prior art which contains the same solution for a similar problem.” *In re Wiseman*, 596 F.2d 1019, 1022, 201 USPQ 658, 661 (CCPA 1979) (emphasis in original).

In *In re Spinnoble*, the claim was directed to a plural compartment mixing vial wherein a center seal plug was placed between two compartments for temporarily isolating a liquid-containing compartment from a solids-containing compartment. The claim differed from the prior art in the selection of butyl rubber with a silicone coating as the plug material instead of natural rubber. The prior art recognized that leakage from the liquid to the solids compartment was a problem, and considered the problem to be a result of moisture passing around the center plug because of microscopic fissures inherently present in molded or blown glass. The court found the inventor discovered the cause of moisture transmission was through the center plug, and there was no teaching in the prior art which would suggest the necessity of selecting applicant's plug material which was more impervious to liquids than the natural rubber plug of the prior art.

In *In re Wiseman*, 596 F.2d at 1022, 201 USPQ at 661, claims directed to grooved carbon disc brakes wherein the grooves were provided to vent steam or vapor during a braking action to minimize fading of the brakes were rejected as obvious over a reference showing carbon disc brakes without grooves in combination with a reference showing grooves in noncarbon disc brakes for the purpose of cooling the faces of the braking members and eliminating dust, thereby reducing fading of the brakes. The court affirmed the rejection, holding that even if applicants discovered the cause of a problem, the solution would have been obvious from the prior art which contained the same solution (inserting grooves in disc brakes) for a similar problem.

#### **APPLICANTS ALLEGING DISCOVERY OF A SOURCE OF A PROBLEM MUST PROVIDE SUBSTANTIATING EVIDENCE**

Applicants who allege they discovered the source of a problem must provide evidence substantiating the allegation, either by way of affidavits or declarations, or by way of a clear and persuasive assertion in the specification. In *re Wiseman*, 596 F.2d 1019, 201 USPQ 658 (CCPA 1979) (unsubstantiated statement of counsel was insufficient to show appellants discovered source of the problem); *In re Kaslow*, 707 F.2d 1366, 217 USPQ 1089 (Fed. Cir. 1983) (Claims were directed to a method for redeeming merchandising coupons which contain a UPC "5-by-5" bar code

wherein, among other steps, the memory at each supermarket would identify coupons by manufacturer and transmit the data to a central computer to provide an audit thereby eliminating the need for clearinghouses and preventing retailer fraud. In challenging the propriety of an obviousness rejection, appellant argued he discovered the source of a problem (retailer fraud and manual clearinghouse operations) and its solution. The court found appellant's specification did not support the argument that he discovered the source of the problem with respect to retailer fraud, and that the claimed invention failed to solve the problem of manual clearinghouse operations.).

#### **DISCLOSED INHERENT PROPERTIES ARE PART OF "AS A WHOLE" INQUIRY**

"In determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question... but also to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification. . . . Just as we look to a chemical and its properties when we examine the obviousness of a composition of matter claim, it is this invention *as a whole*, and not some part of it, which must be obvious under 35 U.S.C. 103." *In re Antonie*, 559 F.2d 618, 620, 195 USPQ 6,8 (CCPA 1977) (emphasis in original) (citations omitted) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The court found the invention as a whole was the ratio of 0.12 and its inherent property that the claimed devices maximized treatment capacity regardless of other variables in the devices. The prior art did not recognize that treatment capacity was a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result-effective variable.). See also *In re Papesch*, 315 F.2d 381, 391, 137 USPQ 43, 51 (CCPA 1963) ("From the standpoint of patent law, a compound and all its properties are inseparable.").

Obviousness cannot be predicated on what is not known at the time an invention is made, even if the inherency of a certain feature is later established. *In re Rijckaert*, 9 F.2d 1531, 28 USPQ2d 1955 (Fed. Cir.

1993). See MPEP § 2112 for the requirements of rejections based on inherency.

### **PRIOR ART MUST BE CONSIDERED IN ITS ENTIRETY, INCLUDING DISCLOSURES THAT TEACH AWAY FROM THE CLAIMS**

A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984) (Claims were directed to a process of producing a porous article by expanding shaped, unsintered, highly crystalline poly(tetrafluoroethylene) (PTFE) by stretching said PTFE at a 10% per second rate to more than five times the original length. The prior art teachings with regard to unsintered PTFE indicated the material does not respond to conventional plastics processing, and the material should be stretched slowly. A reference teaching rapid stretching of conventional plastic polypropylene with reduced crystallinity combined with a reference teaching stretching unsintered PTFE would not suggest rapid stretching of highly crystalline PTFE, in light of the disclosures in the art that teach away from the invention, i.e., that the conventional polypropylene should have reduced crystallinity before stretching, and that PTFE should be stretched slowly.).

### **2141.03 Level of Ordinary Skill in the Art [R-2]**

#### **FACTORS TO CONSIDER IN DETERMINING LEVEL OF ORDINARY SKILL**

"Factors that may be considered in determining level of ordinary skill in the art include (1) the educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of active workers in the field." *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696, 218 USPQ 865, 868 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

The "hypothetical 'person having ordinary skill in the art' to which the claimed subject matter pertains

would, of necessity have the capability of understanding the scientific and engineering principles applicable to the pertinent art." *Ex parte Hiyamizu*, 10 USPQ2d 1393, 1394 (Bd. Pat. App. & Inter. 1988) (The Board disagreed with the examiner's definition of one of ordinary skill in the art (a doctorate level engineer or scientist working at least 40 hours per week in semiconductor research or development), finding that the hypothetical person is not definable by way of credentials, and that the evidence in the application did not support the conclusion that such a person would require a doctorate or equivalent knowledge in science or engineering.).

References which do not qualify as prior art because they postdate the claimed invention may be relied upon to show the level of ordinary skill in the art at or around the time the invention was made. *Ex parte Erlich*, 22 USPQ 1463 (Bd. Pat. App. & Inter. 1992). >Moreover, documents not available as prior art because the documents were not widely disseminated may be used to demonstrate the level of ordinary skill in the art. For example, the document may be relevant to establishing "a motivation to combine which is implicit in the knowledge of one of ordinary skill in the art." *National Steel Car Ltd. v. Canadian Pacific Railway Ltd.*, 357 F.3d 1319, 1338, 69 USPQ2d 1641, 1656 (Fed. Cir. 2004)(holding that a drawing made by an engineer that was not prior art may nonetheless "be used to demonstrate a motivation to combine implicit in the knowledge of one of ordinary skill in the art").<

#### **SPECIFYING A PARTICULAR LEVEL OF SKILL IS NOT NECESSARY WHERE THE PRIOR ART ITSELF REFLECTS AN APPROPRIATE LEVEL**

If the only facts of record pertaining to the level of skill in the art are found within the prior art of record, the court has held that an invention may be held to have been obvious without a specific finding of a particular level of skill where the prior art itself reflects an appropriate level. *Chore-Time Equipment, Inc. v. Cumberland Corp.*, 713 F.2d 774, 218 USPQ 673 (Fed. Cir. 1983). See also *Okajima v. Bourdeau*, 261 F.3d 1350, 1355, 59 USPQ2d 1795, 1797 (Fed. Cir. 2001).

absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., *PPG*, 156 F.3d at 1355, 48 USPQ2d at 1355 ("PPG could have defined the scope of the phrase 'consisting essentially of' for purposes of its patent by making clear in its specification what it regarded as constituting a material change in the basic and novel characteristics of the invention."). See also *AK Steel Corp. v. Sollac*, 344 F.3d 1234, 1240-41, 68 USPQ2d 1280, 1283-84 (Fed. Cir. 2003) (Applicant's statement in the specification that "silicon contents in the coating metal should not exceed about 0.5% by weight" along with a discussion of the deleterious effects of silicon provided basis to conclude that silicon in excess of 0.5% by weight would materially alter the basic and novel properties of the invention. Thus, "consisting essentially of" as recited in the preamble was interpreted to permit no more than 0.5% by weight of silicon in the aluminum coating.); *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 895-96 (CCPA 1963). If an applicant contends that additional steps or materials in the prior art are excluded by the recitation of "consisting essentially of," applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention. *In re De Lajarte*, 337 F.2d 870, 143 USPQ 256 (CCPA 1964). See also *Ex parte Hoffman*, 12 USPQ2d 1061, 1063-64 (Bd. Pat. App. & Inter. 1989) ("Although 'consisting essentially of' is typically used and defined in the context of compositions of matter, we find nothing intrinsically wrong with the use of such language as a modifier of method steps. . . [rendering] the claim open only for the inclusion of steps which do not materially affect the basic and novel characteristics of the claimed method. To determine the steps included versus excluded the claim must be read in light of the specification. . . . [I]t is an applicant's burden to establish that a step practiced in a prior art method is excluded from his claims by 'consisting essentially of' language.").

## OTHER TRANSITIONAL PHRASES

Transitional phrases such as "having" must be interpreted in light of the specification to determine

whether open or closed claim language is intended. See, e.g., *Lampi Corp. v. American Power Products Inc.*, 228 F.3d 1365, 1376, 56 USPQ2d 1445, 1453 (Fed. Cir. 2000) (The term "having" was interpreted as open terminology, allowing the inclusion of other components in addition to those recited); *Crystal Semiconductor Corp. v. TriTech Microelectronics Int'l Inc.*, 246 F.3d 1336, 1348, 57 USPQ2d 1953, 1959 (Fed. Cir. 2001) (term "having" in transitional phrase "does not create a presumption that the body of the claim is open"); *Regents of the Univ. of Cal. v. Eli Lilly & Co.*, 119 F.3d 1559, 1573, 43 USPQ2d 1398, 1410 (Fed. Cir. 1997) (In the context of a cDNA having a sequence coding for human PI, the term "having" still permitted inclusion of other moieties.). The transitional phrase "composed of" has been interpreted in the same manner as either "consisting of" or "consisting essentially of," depending on the facts of the particular case. See *AFG Industries, Inc. v. Cardinal IG Company*, 239 F.3d 1239, 1245, 57 USPQ2d 1776, 1780-81 (Fed. Cir. 2001) (based on specification and other evidence, "composed of" interpreted in same manner as "consisting essentially of"); *In re Bertsch*, 132 F.2d 1014, 1019-20, 56 USPQ 379, 384 (CCPA 1942) ("Composed of" interpreted in same manner as "consisting of"; however, court further remarked that "the words 'composed of' may under certain circumstances be given, in patent law, a broader meaning than 'consisting of.'").

## 2112 Requirements of Rejection Based on Inherency; Burden of Proof [R-2]

The express, implicit, and inherent disclosures of a prior art reference may be relied upon in the rejection of claims under 35 U.S.C. 102 or 103. "The inherent teaching of a prior art reference, a question of fact, arises both in the context of anticipation and obviousness." *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995) (affirmed a 35 U.S.C. 103 rejection based in part on inherent disclosure in one of the references). See also *In re Grasselli*, 713 F.2d 731, 739, 218 USPQ 769, 775 (Fed. Cir. 1983).

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# I. <SOMETHING WHICH IS OLD DOES NOT BECOME PATENTABLE UPON THE DISCOVERY OF A NEW PROPERTY

\*>“[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art’s functioning, does not render the old composition patentably new to the discoverer.” *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). Thus the claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable. *In re Best*, 562 F.2d 1252, 1254, 195 USPQ 430, 433 (CCPA 1977). See also MPEP § 2112.01 with regard to inherency and product-by-process claims and MPEP § 2141.02 with regard to inherency and rejections under 35 U.S.C. 103.

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# II. INHERENT FEATURE NEED NOT BE RECOGNIZED AT THE TIME OF THE INVENTION

There is no requirement that a person of ordinary skill in the art would have recognized the inherent disclosure *at the time of invention*, but only that the subject matter is in fact inherent in the prior art reference. *Schering Corp. v. Geneva Pharm. Inc.*, 339 F.3d 1373, 1377, 67 USPQ2d 1664, 1668 (Fed. Cir. 2003) (rejecting the contention that inherent anticipation requires recognition by a person of ordinary skill in the art before the critical date and allowing expert testimony with respect to post-critical date clinical trials to show inherency); see also *Toro Co. v. Deere & Co.*, 355 F.3d 1313, 1320, 69 USPQ2d 1584, 1590 (Fed. Cir. 2004)(“[T]he fact that a characteristic is a necessary feature or result of a prior-art embodiment (that is itself sufficiently described and enabled) is enough for inherent anticipation, even if that fact was unknown at the time of the prior invention.”); *Abbott Labs v. Geneva Pharms., Inc.*, 182 F.3d 1315, 1319, 51 USPQ2d 1307, 1310 (Fed.Cir.1999) (“If a product that is offered for sale inherently possesses each of the limitations of the claims, then the invention is on sale, whether or not the parties to the transaction recognize that the product possesses the claimed characteristics.”); *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342,

1348-49 (Fed. Cir. 1999) (“Because ‘sufficient aeration’ was inherent in the prior art, it is irrelevant that the prior art did not recognize the key aspect of [the] invention.... An inherent structure, composition, or function is not necessarily known.”).

# III. <A REJECTION UNDER 35 U.S.C. 102/103 CAN BE MADE WHEN THE PRIOR ART PRODUCT SEEMS TO BE IDENTICAL EXCEPT THAT THE PRIOR ART IS SILENT AS TO AN INHERENT CHARACTERISTIC

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. “There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102.” *In re Best*, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

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# IV. <EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING TO SHOW INHERENCY

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). “To establish inherency, the extrinsic evidence ‘must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a

certain thing may result from a given set of circumstances is not sufficient.’ ” *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted) (The claims were drawn to a disposable diaper having three fastening elements. The reference disclosed two fastening elements that could perform the same function as the three fastening elements in the claims. The court construed the claims to require three separate elements and held that the reference did not disclose a separate third fastening element, either expressly or inherently.).

“In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.” *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original) (Applicant’s invention was directed to a biaxially oriented, flexible dilation catheter balloon (a tube which expands upon inflation) used, for example, in clearing the blood vessels of heart patients). The examiner applied a U.S. patent to Schjeldahl which disclosed injection molding a tubular preform and then injecting air into the preform to expand it against a mold (blow molding). The reference did not directly state that the end product balloon was biaxially oriented. It did disclose that the balloon was “formed from a thin flexible inelastic, high tensile strength, biaxially oriented synthetic plastic material.” *Id.* at 1462 (emphasis in original). The examiner argued that Schjeldahl’s balloon was inherently biaxially oriented. The Board reversed on the basis that the examiner did not provide objective evidence or cogent technical reasoning to support the conclusion of inherency.).

In *In re Schreiber*, 128 F.3d 1473, 44 USPQ2d 1429 (Fed. Cir. 1997), the court affirmed a finding that a prior patent to a conical spout used primarily to dispense oil from an oil can inherently performed the functions recited in applicant’s claim to a conical container top for dispensing popped popcorn. The examiner had asserted inherency based on the structural similarity between the patented spout and applicant’s disclosed top, i.e., both structures had the same general shape. The court stated:

[N]othing in Schreiber’s [applicant’s] claim suggests that Schreiber’s container is of a ‘different shape’ than Harz’s [patent]. In fact, [ ] an embodiment according to Harz

(Fig. 5) and the embodiment depicted in Fig. 1 of Schreiber’s application have the same general shape. For that reason, the examiner was justified in concluding that the opening of a conically shaped top as disclosed by Harz is inherently of a size sufficient to ‘allow [ ] several kernels of popped popcorn to pass through at the same time’ and that the taper of Harz’s conically shaped top is inherently of such a shape ‘as to by itself jam up the popped popcorn before the end of the cone and permit the dispensing of only a few kernels at a shake of a package when the top is mounted to the container.’ The examiner therefore correctly found that Harz established a *prima facie* case of anticipation.

*In re Schreiber*, 128 F.3d at 1478, 44 USPQ2d at 1432.

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V. **<ONCE A REFERENCE TEACHING PRODUCT APPEARING TO BE SUBSTANTIALLY IDENTICAL IS MADE THE BASIS OF A REJECTION, AND THE EXAMINER PRESENTS EVIDENCE OR REASONING TENDING TO SHOW INHERENCY, THE BURDEN SHIFTS TO THE APPLICANT TO SHOW AN UNOBVIOUS DIFFERENCE**

“[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on ‘inherency’ under 35 U.S.C. 102, on ‘*prima facie* obviousness’ under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted].” The burden of proof is similar to that required with respect to product-by-process claims. *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

In *In re Fitzgerald*, the claims were directed to a self-locking screw-threaded fastener comprising a metallic threaded fastener having patches of crystallizable thermoplastic bonded thereto. The claim further specified that the thermoplastic had a reduced degree of crystallization shrinkage. The specification disclosed that the locking fastener was made by heating the metal fastener to melt a thermoplastic blank which is pressed against the metal. After the thermoplastic adheres to the metal fastener, the end product is cooled by quenching in water. The examiner made a rejection based on a U.S. patent to Barnes. Barnes

taught a self-locking fastener in which the patch of thermoplastic was made by depositing thermoplastic powder on a metallic fastener which was then heated. The end product was cooled in ambient air, by cooling air or by contacting the fastener with a water trough. The court first noted that the two fasteners were identical or only slightly different from each other. "Both fasteners possess the same utility, employ the same crystallizable polymer (nylon 11), and have an adherent plastic patch formed by melting and then cooling the polymer." *Id.* at 596 n.1, 619 F.2d at 70 n.1. The court then noted that the Board had found that Barnes' cooling rate could reasonably be expected to result in a polymer possessing the claimed crystallization shrinkage rate. Applicants had not rebutted this finding with evidence that the shrinkage rate was indeed different. They had only argued that the crystallization shrinkage rate was dependent on the cool down rate and that the cool down rate of Barnes was much slower than theirs. Because a difference in the cool down rate does not necessarily result in a difference in shrinkage, objective evidence was required to rebut the 35 U.S.C. 102/103 *prima facie* case.

In *In re Schreiber*, 128 F.3d 1473, 1478, 44 USPQ2d 1429, 1432 (Fed.Cir.1997), the court held that applicant's declaration failed to overcome a *prima facie* case of anticipation because the declaration did not specify the dimensions of either the dispensing top that was tested or the popcorn that was used. Applicant's declaration merely asserted that a conical dispensing top built according to a figure in the prior art patent was too small to jam and dispense popcorn and thus could not inherently perform the functions recited in applicant's claims. The court pointed out the disclosure of the prior art patent was not limited to use as an oil can dispenser, but rather was broader than the precise configuration shown in the patent's figure. The court also noted that the Board of Patent Appeals and Interferences found as a factual matter that a scaled-up version of the top disclosed in the patent would be capable of performing the functions recited in applicant's claim.

See MPEP § 2113 for more information on the analogous burden of proof applied to product-by-process claims.

## 2112.01 Composition, Product, and Apparatus Claims [R-2]

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### I. <PRODUCT AND APPARATUS CLAIMS — WHEN THE STRUCTURE RECITED IN THE REFERENCE IS SUBSTANTIALLY IDENTICAL TO THAT OF THE CLAIMS, CLAIMED PROPERTIES OR FUNCTIONS ARE PRESUMED TO BE INHERENT

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best*, 562 F.2d at 1255, 195 USPQ at 433. See also *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (Claims were directed to a titanium alloy containing 0.2-0.4% Mo and 0.6-0.9% Ni having corrosion resistance. A Russian article disclosed a titanium alloy containing 0.25% Mo and 0.75% Ni but was silent as to corrosion resistance. The Federal Circuit held that the claim was anticipated because the percentages of Mo and Ni were squarely within the claimed ranges. The court went on to say that it was immaterial what properties the alloys had or who discovered the properties because the composition is the same and thus must necessarily exhibit the properties.).

See also *In re Ludtke*, 441 F.2d 660, 169 USPQ 563 (CCPA 1971) (Claim 1 was directed to a parachute canopy having concentric circumferential panels radially separated from each other by radially extending tie lines. The panels were separated "such that the critical velocity of each successively larger panel will be less than the critical velocity of the previous panel, whereby said parachute will sequentially open and



**FULL TEXT OF CASES (USPQ2D)**  
All Other Cases

**In re Robertson (CA FC) 49 USPQ2d 1949 In re  
Robertson**

**U.S. Court of Appeals Federal Circuit  
49 USPQ2d 1949**

**Decided February 25, 1999  
No. 98-1270**

**Headnotes**

**PATENTS**

**1. Patentability/Validity -- Anticipation -- In general (§ 115.0701)**

Element of claim is not "inherent" in disclosure of prior art reference unless extrinsic evidence clearly shows that missing descriptive matter is necessarily present in thing described in reference, and that it would be so recognized by persons of ordinary skill; inherency may not be established by mere probabilities or possibilities, and mere fact that certain thing may result from given set of circumstances is not sufficient.

**2. Patentability/Validity -- Anticipation -- Identity of elements (§ 115.0704)**

Board of Patent Appeals and Interferences improperly rejected application claim for fastening and disposal system for diapers on ground that prior reference inherently contained all elements of claim, since board failed to recognize that third mechanical fastening means of application claim, used to secure diaper for disposal, was separate from and independent of two other means used to attach diaper to wearer, and since

board's theory that two fastening devices in reference were capable of being intermingled to perform same function as third and first fastening elements in application claim rests upon mere probability or possibility that is insufficient to establish inherency.

## **Case History and Disposition:**

Page 1949

**Appeal from the U.S. Patent and Trademark Office, Board of Patent Appeals and Interferences.**

**Patent application of Anthony J. Robertson and Charles L. Scripps, serial no. 08/171,484 (fastening and disposal system for diapers). Applicants appeal from rejection of application claim 76 on grounds of anticipation and obviousness. Reversed; Rader, J., concurring in separate opinion.**

### **Attorneys:**

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### **Judge:**

**Before Newman, circuit judge, Friedman, senior circuit judge, and Rader, circuit judge.**

## **Opinion Text**

### **Opinion By:**

**Friedman, S.J.**

This appeal challenges the decision of the Board of Patent Appeals and Interferences

(Board) that claim 76 in the appellants' patent application was anticipated by and obvious over United States Patent No. 4,895,569 (the Wilson patent). We reverse.

I

Both claim 76 and Wilson involve fastening and disposal systems for diapers. In both, the body of the diaper features a small front and a larger rear section. The outer edges of those sections are attached at the wearer's waist in the hip area. Once the diaper is soiled and then removed, the smaller front section is rolled up into the larger rear section and secured in this rolled-up configuration by fasteners.

The appellants' application is for "an improved mechanical fastening system for . . . disposable absorbent articles [ *i.e.* , diapers] that provides convenient disposal of the absorbent article." [J.A. 12] Claim 76 covers:

[A] mechanical fastening system for forming side closures . . . comprising a closure member . . . comprising a first mechanical fastening means for forming a closure, said first mechanical fastening means comprising a first fastening element; a landing member . . . comprising a second mechanical fastening means for forming a closure with said first mechanical fastening means, said second mechanical fastening means comprising a second fastening element mechanically engageable with said first element; and disposal means for allowing the absorbent article to be secured in a disposal configuration after use, said disposal means comprising a third mechanical fastening means for securing the absorbent article in the disposal configuration, said third mechanical fastening means comprising a third fastening element mechanically engageable with said first fastening element . . .

Claim 76 thus provides for two mechanical fastening means to attach the diaper to the wearer and a third such means for securing the diaper for disposal.

The Wilson patent discloses two snap elements on fastening strips attached to the outer edges of the front and rear hip sections of the garment. The fastening strips may also include "secondary load-bearing closure means" -- additional fasteners to secure the garment; they may be identical to the snaps.

Wilson also states:

[D]isposal of the soiled garment upon removal from the body is easily accomplished by folding the front panel . . . inwardly and then fastening the rear pair of mating fastener members . . . to one another, thus neatly bundling the garment into a closed compact package for disposal.

[JA 085 at col. 6, 11, 20-25]

In other words, Wilson does not provide a separate fastening means to be used in disposing of the diaper. Instead, it suggests that disposal of the used diaper may be "easily accomplished" by rolling it up and employing the same fasteners used to attach the diaper to the wearer to form "a closed compact package for disposal."

In holding that the invention claim 76 covers was anticipated by Wilson, the Board did not hold that Wilson set forth a third fastening means. Instead, it found that Wilson anticipated claim 76 "under principles of inherency." [J.A. 5] Applying the language of

claim 76 to the operation of Wilson, it concluded that "an artisan would readily understand the disposable absorbent garment of Wilson . . . as being inherently capable of [making the secondary load-bearing closure means] (third fastening element) mechanically engageable with [the other snap fasteners on the fastening strip] (first fastening element)" [J.A. 5] -- *i.e.*, using the secondary closure not with its mate, but with one of the primary snap fasteners. The Board summarily affirmed the examiner's alternative ruling that claim 76 would have been obvious in light of Wilson because "claim 76 lacks novelty." [J.A. 7]

## II

Anticipation under 35 U.S.C. Section 102(e) requires that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

A. The Wilson patent does not expressly include a third fastening means for disposal of the diaper, as claim 76 requires. That means is separate from and in addition to the other mechanical fastening means and performs a different function than they do. Indeed, Wilson merely suggests that the diaper may be closed for disposal by using the same fastening means that are used for initially attaching the diaper to the body.

[1] B. If the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if that element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that

Page 1951

it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2d 1746, 1749 (Fed. Cir. 1991).

"Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.* at 1269, 20 U.S.P.Q.2d at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981)).

In finding anticipation by inherency, the Board ignored the foregoing critical principles. The Board made no attempt to show that the fastening mechanisms of Wilson that were used to attach the diaper to the wearer also "necessarily" disclosed the third separate fastening mechanism of claim 76 used to close the diaper for disposal, or that an artisan of ordinary skill would so recognize. It cited no extrinsic evidence so indicating.

[2] Instead, the Board ruled that one of the fastening means for attaching the diaper to the wearer also could operate as a third fastening means to close the diaper for disposal and that Wilson therefore inherently contained all the elements of claim 76. [J.A. 5] In doing so, the Board failed to recognize that the third mechanical fastening means in claim 76, used to secure the diaper for disposal, was separate from and independent of the two other mechanical means used to attach the diaper to the person. The Board's theory that these two fastening devices in Wilson were capable of being intermingled to perform the same function as the third and first fastening elements in claim 76 is insufficient to show that the latter device was inherent in Wilson. Indeed, the Board's

analysis rests upon the very kind of probability or possibility -- the odd use of fasteners with other than their mates -- that this court has pointed out is insufficient to establish inherency.

### III

The Board's entire discussion of obviousness was as follows: *The rejection of claim 76 under 35 USC Section 103*

We sustain the rejection of claim 76 under 35 USC Section 103. Above, we found that claim 76 lacks novelty. Lack of novelty is the ultimate of obviousness. See *In re Fracalossi*, 681 F.2d 792, 794, 215 USPQ 569, 571 (CCPA 1982). Thus, claim 76 is appropriately rejected under 35 USC Section 103 as being unpatentable.

The "lack of novelty" upon which the Board based its conclusion of obviousness, however, was its finding of anticipation. Our rejection of that finding eliminates the sole basis of the Board's obviousness determination, which therefore cannot stand. See *In re Adams*, 364 F.2d 473, 480, 150 U.S.P.Q. 646, 651 (C.C.P.A. 1966).

In his brief the Commissioner argues:

Moreover, even if this court interprets claim 76 to require two separate fasteners to perform the closure and disposal functions, it would have been well within the knowledge of one of ordinary skill in the art to take Wilson's one fastener and make it into two separate fasteners. See *In re Graves*, 69 F.3d [1147,] 1152, 36 USPQ2d [1697,] 1701 [(Fed. Cir. 1995)] (When evaluating a reference, it is appropriate to consider the knowledge of a skilled artisan in combination with the teaching of the reference.). Accordingly, claim 76 would have been obvious to one of ordinary skill in the art, and the rejection should be affirmed by this Court.

That, of course, was not the ground on which the Board based its obviousness ruling. We decline to consider counsel's newly-minted theory as an alternative ground for upholding the agency's decision. See *In re Soni*, 54 F.3d 746, 751, 34 U.S.P.Q.2d 1684, 1688 (Fed. Cir. 1995) (citing *In re DeBlauwe*, 736 F.2d 699, 705 n.7, 222 U.S.P.Q. 191, 196 n.7 (Fed. Cir. 1984)). The Board's obviousness ruling cannot be sustained on the ground given by the Board.

### CONCLUSION

The decision of the Board of Patent Appeals and Interferences affirming the examiner's rejection of claim 76 as anticipated by and obvious over the Wilson patent is

### **REVERSED .**

Rader, J., concurring.

Robertson asserts that the prior art Wilson patent does not teach three elements of claim 76: a "third mechanical fastening means," a disposal means on the "outside surface" of the body portion, and end regions that are "in an overlapping configuration when worn." In reversing the Board, this court relies solely on the purported failure of Wilson to teach the third fastening means. Because I believe Wilson teaches such a means, but does not teach the other two limitations at issue, I concur.

In its analysis, this court assumes without discussion that the claimed "third mechanical

fastening means" covers a *separate* third mechanical

Page 1952

fastening means. This issue is key, for if the claim does not require a separate third fastening means, but instead allows the first fastening means to also serve as the third, then the prior art Wilson patent clearly teaches that element of the claim. For two reasons, this claim does not, to my eyes, require a separate third fastening means. First, the claim does not specifically recite a *separate* third fastening means. Second, because the claim is in means-plus-function form, this court consults the specification to identify structure. The specification explicitly teaches that the first and third fastening elements can be the same so long as they are complementary, as they are in Wilson. Accordingly, I agree with the Board that Wilson teaches the claimed "third fastening element."

Wilson does not, however, teach either of the other two claim limitations at issue. As to the disposal means on the "outside surface" of the body portion, Wilson's figs. 12 and 13a-d show the disposal means on the inside of the body portion. As to the end regions that are "in an overlapping configuration when worn," Wilson explicitly teaches that the end regions should abut, not overlap, when worn. To overcome these teachings, the Board relied on the following statement in Wilson: "Further, the fastener members need not be previously mounted on a separate strip as shown then bonded . . . to the stretchable outer cover . . . . Multi-component snaps are available which may be applied directly to a stretchable outer cover material . . . ." Col. 7, l. 65 to col. 8, l. 3. The Board opined that applying snaps directly to the outer cover would result in both a disposal means on the "outside surface" and end regions "in an overlapping configuration when worn." Simply put, the Board has put more weight on this teaching than it can bear. It is far from clear what effect applying the snaps directly to the outer cover will have on the Wilson diaper configuration, let alone that it will result in a configuration satisfying the claim elements at issue. Accordingly, because I believe that the Board clearly erred in this interpretation of Wilson, I would reverse on this ground.

- End of Case -

